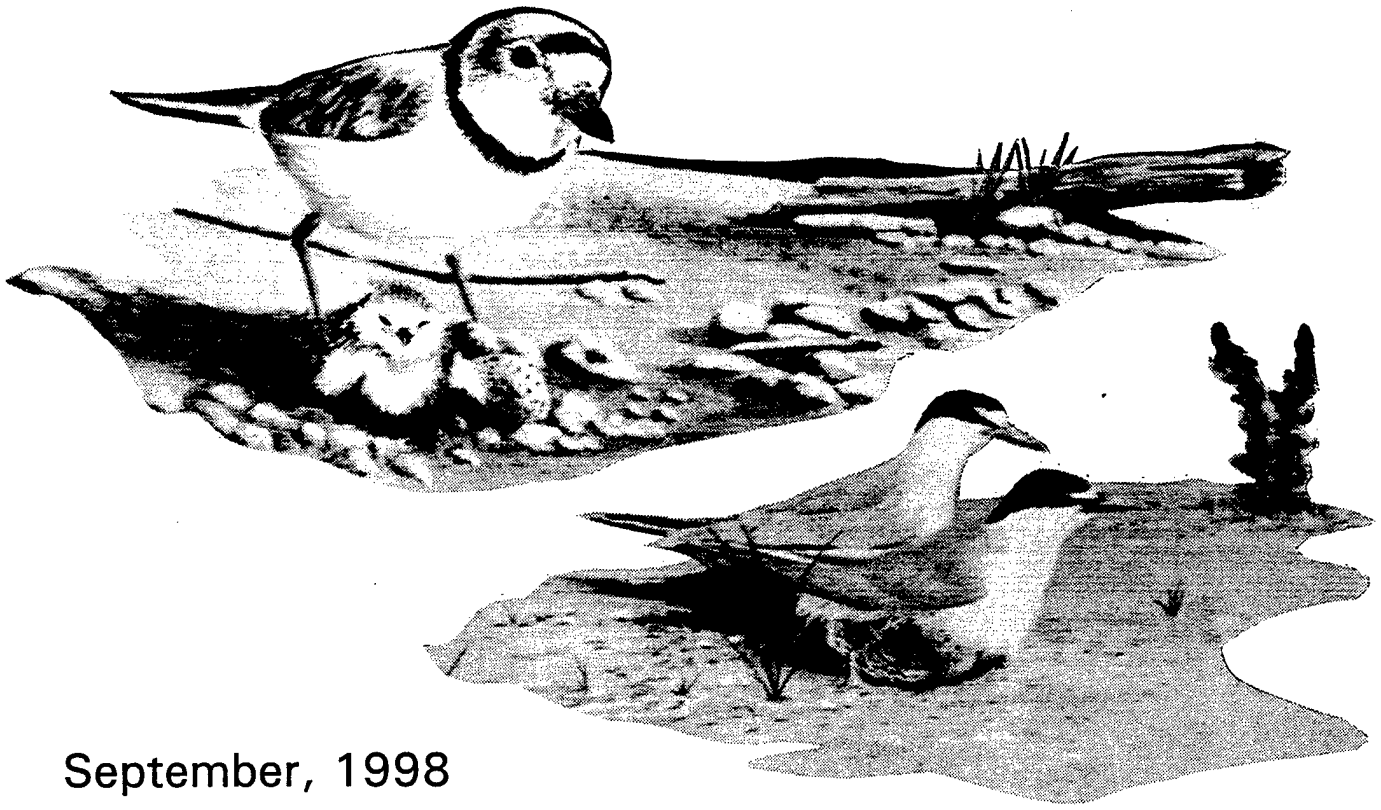
OMAHA DISTRICT - FY 1997
INTERIOR LEAST TERN
AND PIPING PLOVER

PROGRAM SUMMARY



September, 1998

US Army Corps
of Engineers
Omaha District

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY *(Leave blank)*	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	September 1998	Final

4. TITLE AND SUBTITLE
OMAHA DISTRICT - FY 1997 INTERIOR LEAST TERN AND PIPING PLOVER: PROGRAM SUMMARY

5. FUNDING NUMBERS
NA

6. AUTHOR(S)
U.S. ARMY CORPS OF ENGINEERS, OMAHA DISTRICT

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
U.S. ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
215 N. 17TH ST.
OMAHA, NE 68102-4978

8. PERFORMING ORGANIZATION REPORT NUMBER
NA

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)

10. SPONSORING / MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION / AVAILABILITY STATEMENT
DISTRIBUTION STATEMENT A. APPROVED FOR PUBLIC RELEASE; DISTRIBUTION IS UNLIMITED.

12b. DISTRIBUTION CODE
UL

13. ABSTRACT *(Maximum 200 words)*
This 1997 Program Summary is a documentation of all activities within the least tern and piping plover program during 1997.

14. SUBJECT TERMS
interior least tern; piping plover

15. NUMBER OF PAGES

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED

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I. PURPOSE OF THE PROGRAM SUMMARY

The Omaha District Corps of Engineers (District) has been involved in least tern and piping plover studies since the mid 1980's. Actions were increased following the issuance of a Biological Opinion (Opinion) by the U.S. Fish and Wildlife Service on November 14, 1990. Initial District implementation of that Biological Opinion began in 1992, following the development of a one-year work plan. Full District implementation of the Biological Opinion began in 1993, after the development of an implementation plan, "Omaha District's Fiscal Year 1993 - Fiscal Year 1995 Plan for Habitat Improvement for the Interior Least Tern and the Piping Plover," commonly known as the "Red Book." The Red Book was reviewed by the U.S. Fish and Wildlife Service and approved for implementation by the Missouri River Division of the Corps of Engineers (now the Missouri River Region, or "Region"). Corps' responsibilities under the Opinion lie within the Missouri River from Fort Peck Dam to Ponca, Nebraska, and the Missouri River Reservoirs (see Figure 1).

Although comprehensive annual "Summary of Studies" were initially written for agency review of Corps' tern and plover activities, the amount of data collected, the time commitment needed for summaries of this sort, and other year-round demands for staff have precluded the development of such reports during recent years. Survey and monitoring data, however, has always been summarized annually, as is required by the Opinion and the Service collection permit for such monitoring.

This 1997 Program Summary is a documentation of all activities within the least tern and piping plover program during 1997. These activities are summarized under the appropriate Opinion task for which the Omaha District has responsibility.

Information for the 1997 Program Summary was gathered from District personnel after-the-fact, but an attempt was made to be as complete as possible, and the document was internally reviewed by tern and plover supervisory personnel. If funding remains available, the District intends to develop Program Summaries for the years 1994 - 1996, as well as Program Summaries for future years.

The intent of the 1997 Program Summary is to demonstrate to interested agencies and Corps personnel that the Omaha District has met all of its obligations under the 1990 Biological Opinion during 1997.

MISSOURI RIVER STUDY AREAS

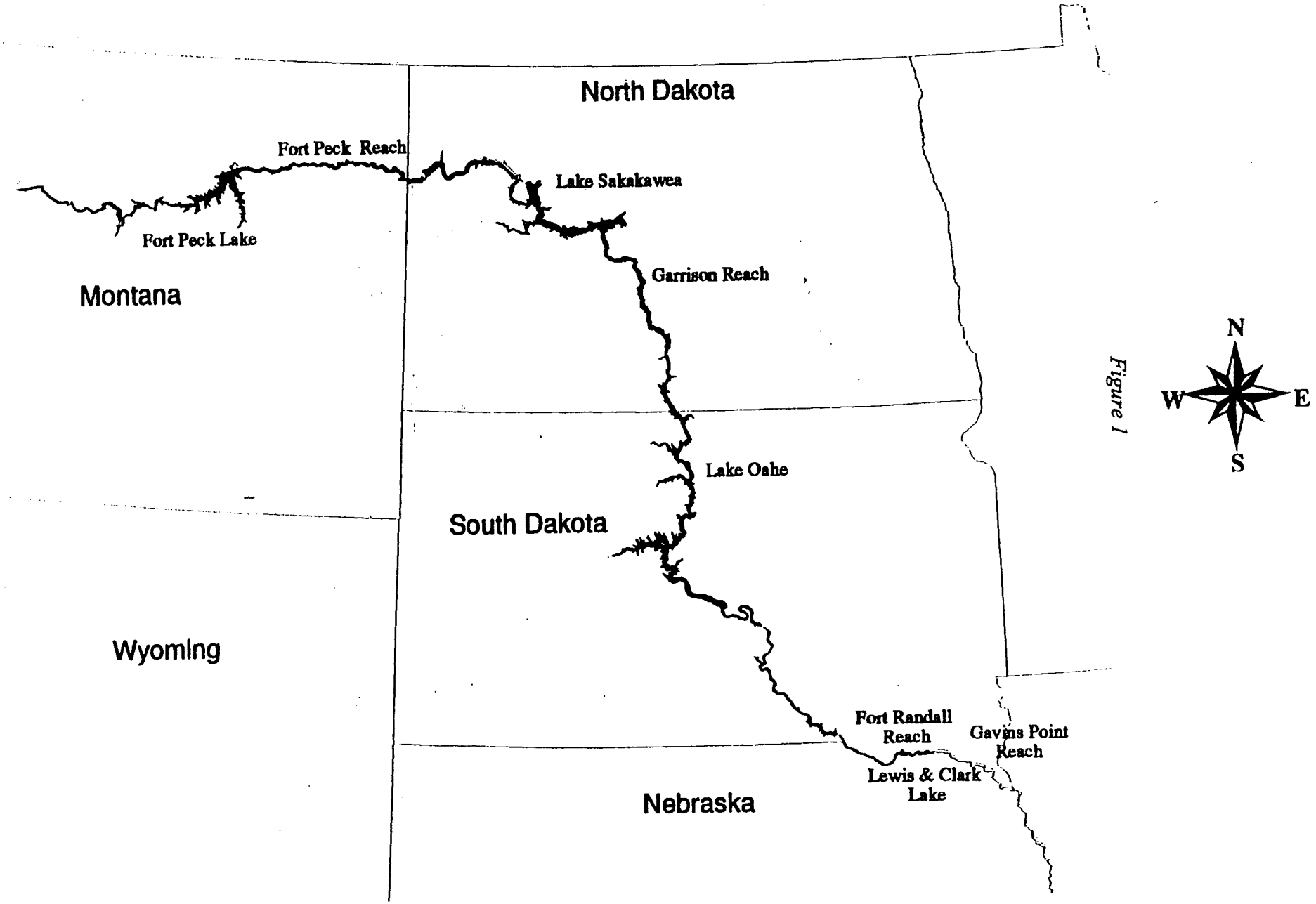


Figure 1

II. BACKGROUND INFORMATION

Biological Opinion

In 1985, the interior least tern was listed as an endangered species, and the piping plover was listed as a threatened species. In 1986, the Service requested that the Corps enter into formal consultation on the operation of the Missouri River Main Stem system and the impact of ongoing operations on federally listed species. Also in 1986, the Corps began funding studies to learn more about the interior least tern and the piping plover within the Missouri River system. In 1987, the Region prepared a Biological Assessment (BA) on the effects of the Missouri River Main Stem system on the least tern and piping plover. The BA concluded that "reservoir releases can affect habitat for both the interior least tern and the piping plover" (U.S. Army Corps of Engineers, 1987).

The BA was transmitted to the Service on October 19, 1987. On May 26, 1989, the Region requested the Service for a Biological Opinion on the operations of the Missouri River Main Stem System (System). The Service's Biological Opinion (Opinion) resulting from this request was sent to the Region on November 14, 1990. The Opinion concluded that "the operations of the System are likely to jeopardize the continued existence of the endangered interior least tern (*Sterna antillarum*) and the threatened piping plover (*Charadrius melodus*) because operations eliminate essential nesting habitat and could result in the loss of at least 12 percent of the interior least tern population and 22 percent of the Northern Great Plains piping plover population..." The Opinion described Reasonable and Prudent Alternatives that could be implemented by the Corps to avoid jeopardizing the two species, Conservation Actions to assist in the recovery of the birds, and Reasonable and Prudent Measures to minimize or avoid the "taking" of terns or plovers or their habitat.

The Region transmitted the Opinion to the District by memorandum dated March 8, 1991, tasking the District to implement specific tasks outlined in the Opinion. Specifically, the District was directed to fund and implement Reasonable and Prudent Alternatives 1b, 1c, 2, 3, 4, 5, and 6; and Reasonable and Prudent Measures 1, 2, and 4. Reasonable and Prudent Alternative 4, which involved the formation of a Tern and Plover Management Team, was subsequently taken over by the Region. Since the Missouri River Natural Resources Committee (MRNRC) was already established as a team of state and federal entities that make annual recommendations in conjunction with the Annual Operating Plan (AOP) for the Missouri River, the Region spear-headed the establishment of a Tern and Plover sub-committee to the MRNRC that would serve as the Tern and Plover Management Team for the purposes of the Opinion. The Tern and Plover sub-

committee has the responsibility of reviewing the Corps' annual report, and making recommendations on Corps' actions for the upcoming year. Tern and plover management recommendations, which could include flow recommendations, are then submitted as part of the MRNRC recommendation to the Corps on how to operate the Missouri River system each year. By having the Tern and Plover Management Team as part of the MRNRC, duplication of effort is avoided, and the potential for recommendations conflicting with other operating interests is reduced.

A summary of all tasks suggested by the Service in the Opinion can be found in Appendix A. A discussion of how these tasks were met during 1997 can be found in Section III, the Implementation of the Biological Opinion by the Omaha District.

Summary of 1997 Weather and Hydrological Conditions

1997 was one of the snowiest seasons ever across the upper midwest, resulting in record runoff (41.3 million acre-feet from January through July) during the first 7 months of the year, during which more than twice the normal runoff poured into the Missouri River. Total 1997 runoff totaled 49.0 million acre-feet (Murphy, personal communication). Runoff in the basin above Sioux City averaged 180 and 165 percent of normal during June and July, respectively (U.S. Army Corps of Engineers, 1998a).

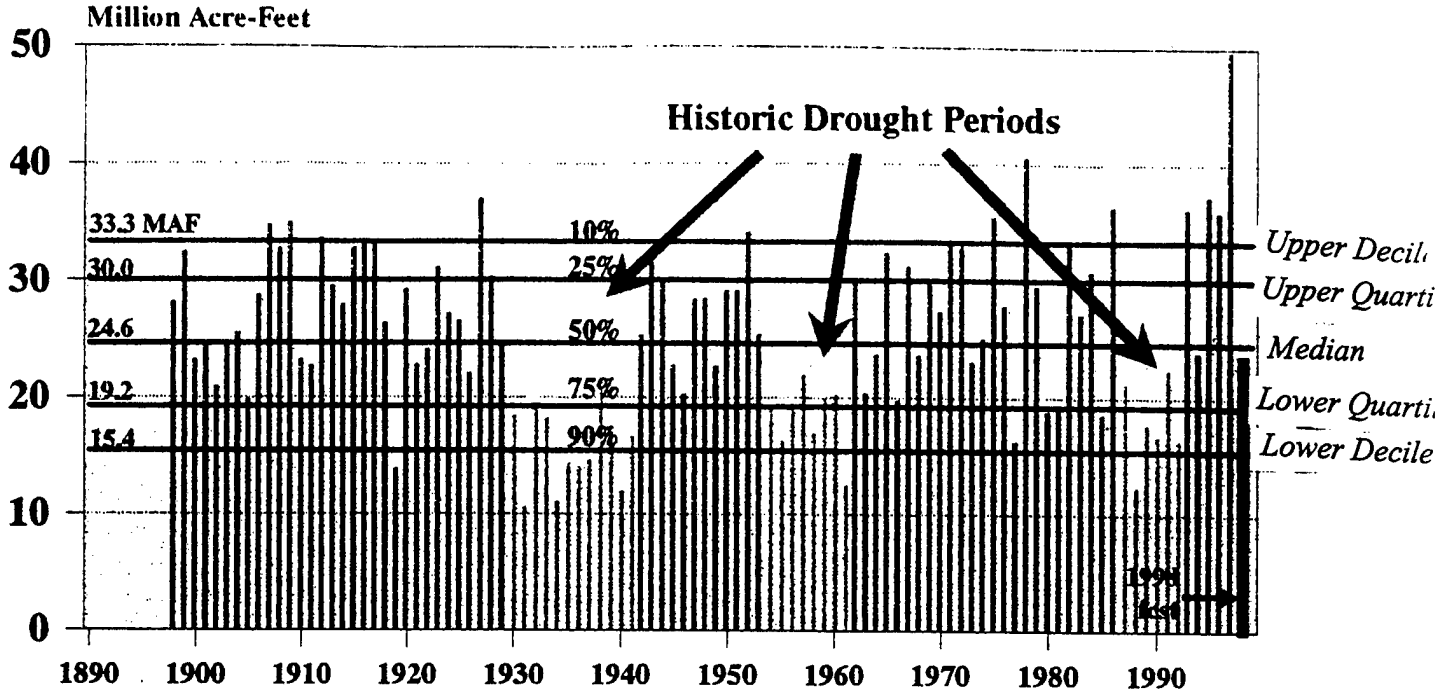
1997 was not an isolated high-inflow year, however, since both 1995 and 1996 also had upper decile inflows. "Upper decile" means that there is only a 10% chance of high flows occurring (compared to the historic record) and 90% of the years historically have inflows that are less than this amount (see Figure 2). 1997 inflow was the highest of the three years.

The high flows limited the Corps' ability to manually create new habitat through vegetation control, dredging, and other forms of habitat manipulation. However, high flows also result in sandbar buildup and scouring of vegetation, creating habitat for years of lesser flows.

Figure 3 compares actual 1997 spring and summer flows with "normal" inflow amounts. Figure 4 summarizes drought / wet conditions in the United States during 1997.

Figure 2

Missouri River Main Stem
Annual Runoff above Sioux City, Iowa

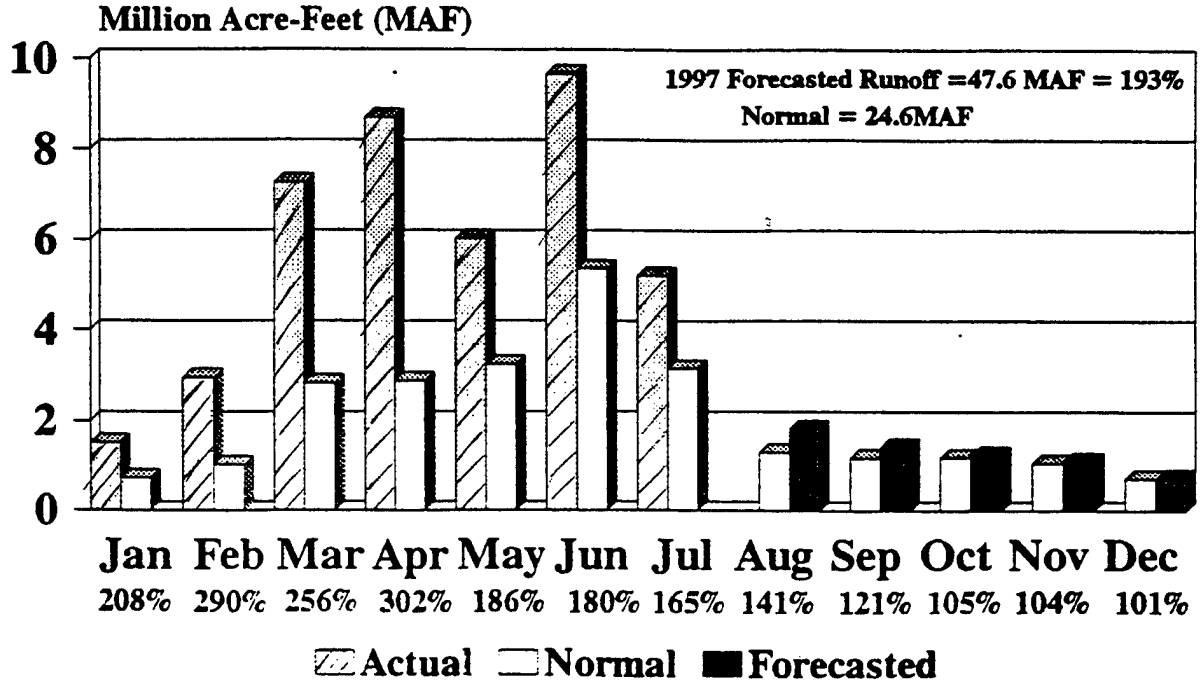


Source: U.S. Army Corps of Engineers, 1998b

1997 runoff = 49.7 maf - 202 % of normal (largest in 100 years of record keeping)

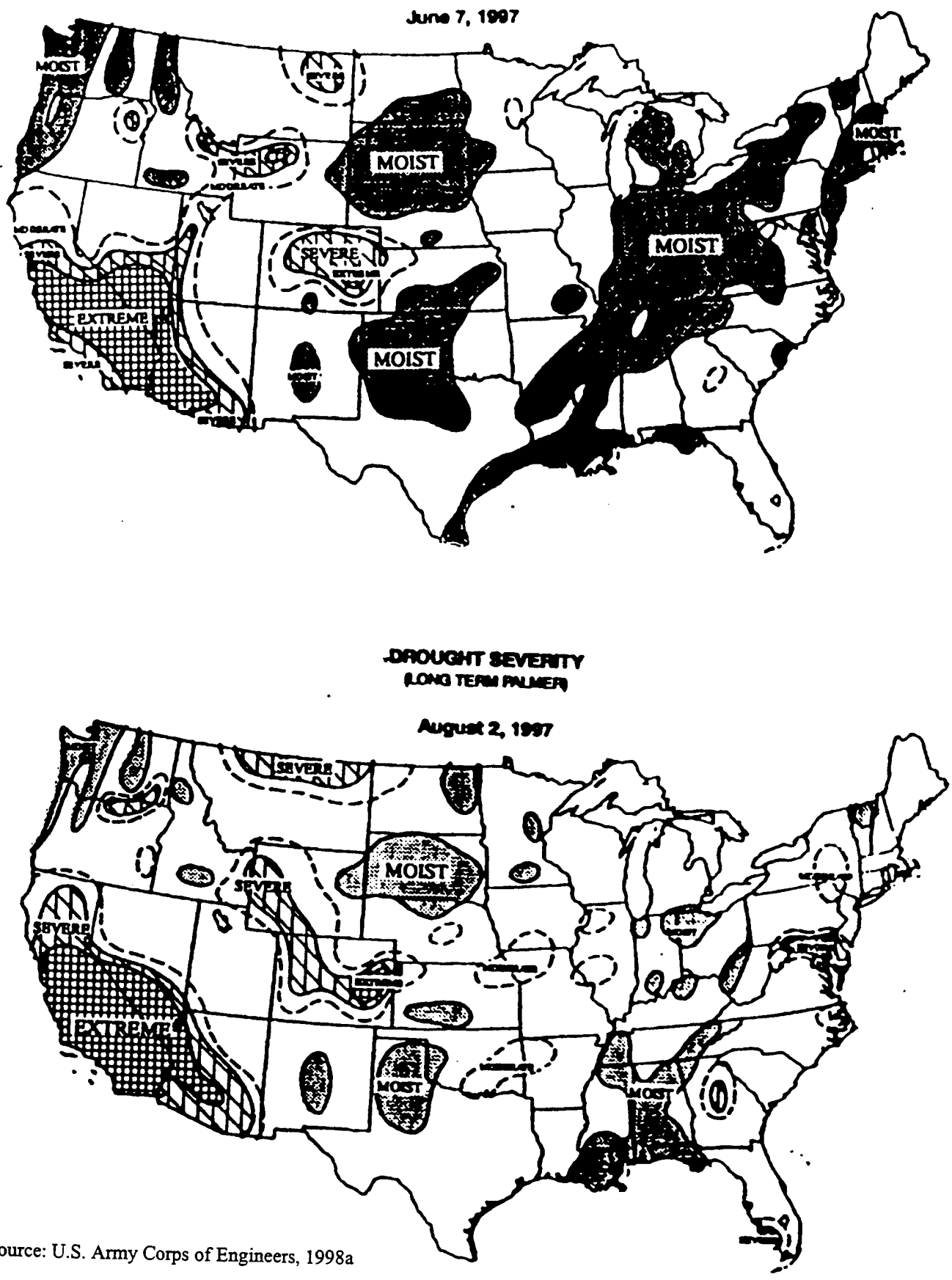
Figure 3

1997 Missouri River Runoff
Above Sioux City, Iowa



Source: U.S. Army Corps of Engineers, 1998a

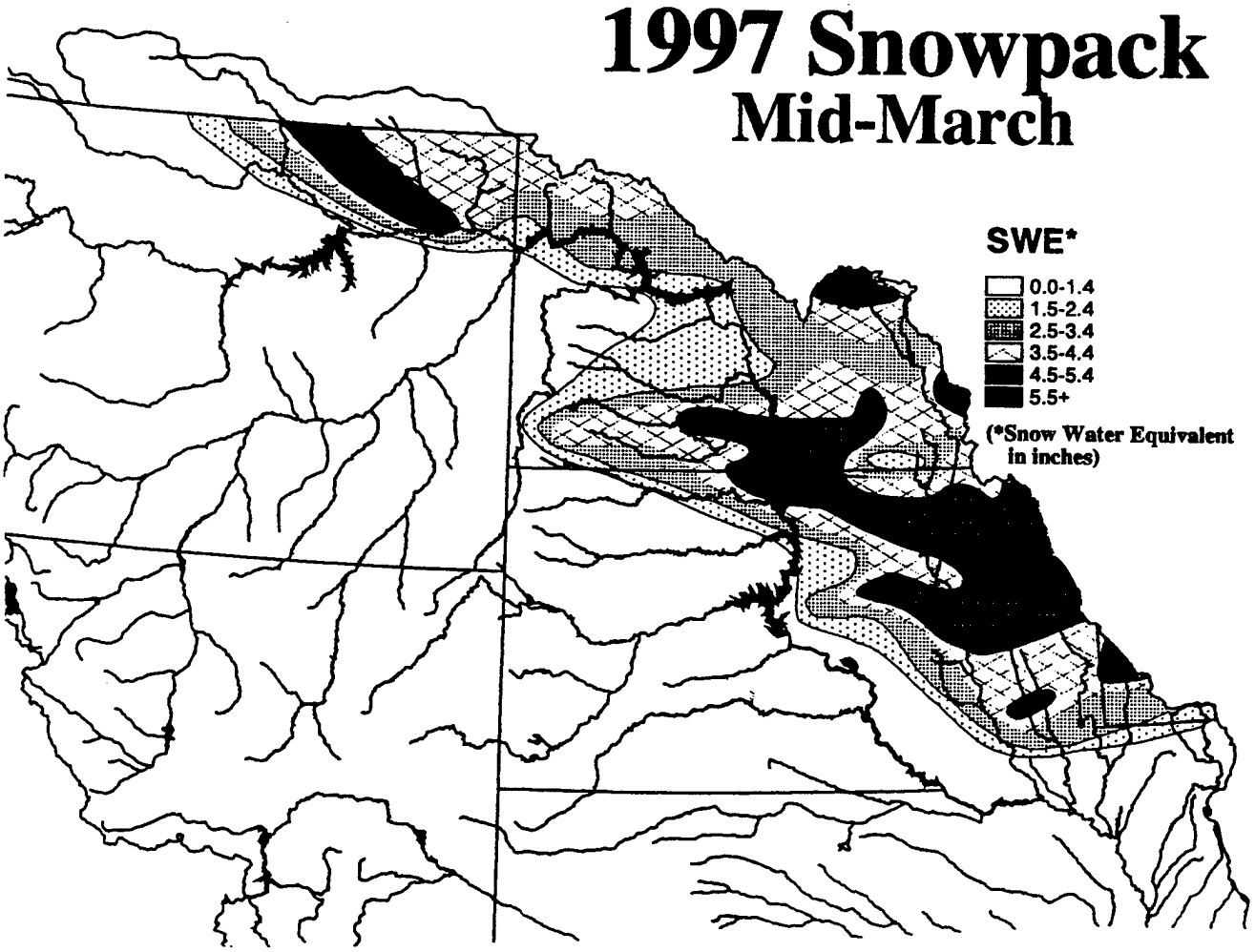
Figure 4



Source: U.S. Army Corps of Engineers, 1998a

The primary reason for the record 1997 inflow was the record snowpack during the winter of 1996, which will be remembered as one of the snowiest on record for the midwest. The Dakotas surpassed all-time snowfall and snow depth records. Frigid temperatures prevented a mid-season melt which frequently occurs. Cold and snowy weather continued through the first half of March when melting began, but an April blizzard increased flooding potential within the Missouri River basin. Numerous snowfall records were broken within the Missouri River basin, including Fargo, North Dakota (117 inches), Bismarck, North Dakota (101.6 inches), and Billings, Montana (101.8 inches). Figure 5 indicates the water content of the mid-March snowpack in relation to the Missouri River and its tributaries.

Figure 5



Source: U.S. Army Corps of Engineers, 1998a

III. DISTRICT IMPLEMENTATION OF THE BIOLOGICAL OPINION - 1997

The District was tasked by the Region to fund and implement most of the tasks outlined in the Opinion. Pertinent parts of the Opinion tasks are included as "bold" text below. The remaining tasks primarily relate to flows and therefore have been implemented by the Region. The reinitiation of consultation, should new information become available, is also the responsibility of the Region.

Reasonable and Prudent Alternatives - Omaha District Responsibilities

Reasonable and prudent alternatives are defined as "alternative actions, identified during formal consultation, that can be implemented in a manner consistent with the intended purpose of the action, that can be implemented consistent with the scope of the Federal Agency's legal authority and jurisdiction, that are economically and technologically feasible, and that the Service believes would avoid the likelihood of jeopardizing the continued existence of listed species or result in the destruction or adverse modification of critical habitat."

1b. Natural nesting habitat should be provided as a priority and other management actions implemented to meet or exceed fledge ratio goals (i.e. 0.70 for terns and 1.44 for plovers). The Corps should, based in part on past years' information, determine the habitat necessary for each river reach and provide management actions within the Corps' authorities to meet or exceed fledge ratios. The Corps should use the following parameters when determining habitat and management actions needed to meet or exceed fledge ratios:

- proximity to foraging habitat no greater than 400 meters from an area that provides schooling and feeding fish that are 3 inches in size

- substrate consisting of very fine to fine sand for terns, and some gravel for plovers

- vegetation should be no greater than 25 percent cover, with optimum cover at 10 percent or less

- nesting areas should be 8 inches or greater in elevation above river levels

- nesting should be substantially disturbance-free from both predation and human disturbance

The Steinke Bay habitat development project was completed by the lake Sakakawea office in April, 1997, in cooperation with the North Dakota Game and Fish Department. This project consisted of vegetation removal and gravel capping of 1.5 acres of shoreline near the Steinke Bay Recreation Area on the DeTrobriand Wildlife Management Area. Nearly 300 tons of gravel was placed on the point which slopes from the reservoir shoreline to above the high water mark. This area was used by a pair of piping plovers during the 1997 nesting season and fledged the only chick on Lake Sakakawea.

Gavins Point staff evaluated a quarry near the Buryanek Recreation Area, Fort Randall Project in April, 1997. The quarry was being considered as a potential habitat improvement project for plovers.

1c. When flows below main stem dams may inundate much nesting habitat, other means will be necessary to establish nesting habitat to meet fledge ratio goals. Created habitat should be established to accommodate the following release flows by river reach and to supplement natural habitat required by Alternative 1b above.

Fort Peck - - above 8,500 cfs and below 13,200 cfs
Garrison - - above 18,000 cfs and below 31,000 cfs
Fort Randall - - above 28,000 cfs and below 38,500 cfs
Gavins Point - - above 30,000 cfs and below 39,500 cfs

Flows at Garrison, Fort Randall, and Gavins Point dams exceeded the "flow window" from May to August during 1997. Flows from May to August ranged as follows:

Fort Peck - - 8,000 - 19,000 cfs	*primarily within flow window*
Garrison - - 31,000 - 57,000 cfs	*exceeds flow window - max avg 59,100*
Fort Randall - - 53,000 - 61,000 cfs	*exceeds flow window - max avg 67,500*
Gavins Point - - 59,000 - 65,000 cfs	*exceeds flow window - max avg 70,100*

When flows are below the "flow windows," established in the Opinion, there should already be enough sand exposed for tern and plover habitat that year, but low water years may be ideal for creation of habitat to accommodate flows within the "flow windows." When flows exceed the "flow windows," it indicates an unusually wet year during which nesting everywhere (even uncontrolled rivers) is likely to be inundated. Even created "high elevation" habitat is at risk when the upper limit of the "flow windows" are exceeded. Several high water years in recent years have prompted the Corps to enter into additional measures to protect the birds from inundation, such as egg relocation and chick rearing (see additional information under Conservation Measures and Appendix G).

High flows from the lower three dams during 1997 should aid in scouring existing vegetation at elevations within the flow windows, and to form additional high elevation sandbar habitat for future years. In addition to flow-related incidental habitat creation, additional efforts for high elevation creation were accomplished.

Below Fort Peck Dam, which had flows within the "flow window" during 1997, high elevation habitat was treated with herbicide on five sites in the upper end of Lake Sakakawea near the Yellowstone River confluence. This habitat will provide escape cover for pre-fledged chicks in case discharges from the Yellowstone River inundate natural areas during the chick-rearing period.

The Garrison Project office, in cooperation with the Service and the Bureau of Reclamation, initiated the creation of an experimental island development project on Lake Audubon during 1997. This project will create plover nesting islands behind a water control structure and do beach replenishment on three islands in Lake Audubon. Specifics on the habitat effort can be found in Appendix D.

2. The Corps should provide information on tern and plover management strategies during the development of the draft Annual Operating Plan in the fall and after March 1 when the runoff forecast is made.

Information on predicted 1997 tern and plover tasks was provided to the Region for inclusion in the 1996-97 AOP. Information on accomplished 1997 tern and plover tasks was provided to the Region for inclusion in the 1997-1998 AOP. Drafts of both documents were sent to the Service and the MRNRC for comment. Public meetings were held to gather input prior to finalization.

3. The Corps should compile a separate annual report by December 31 of each year or include in the Annual Operating Plan a report outlining tern and plover management actions, including reasonable and prudent alternatives and reasonable and prudent measures implemented during the operating year, their success in attaining fledge ratio standards and meeting habitat needs, and anticipated actions for the upcoming year. Monitoring information in the report should include:

- **tern and plover fledge ratios**
- **tern and plover population survey results**
- **nest elevations**
- **mapping of nesting habitat**
- **estimates of sandbar acreage at least every three years**
- **historic hourly release data from May 1 to August 30**

The Missouri River Interior Least Tern and Piping Plover Permit Activity Report (Report), dated December, 1997, was prepared by the District in order to document survey and monitoring activities during 1997. Information on additional studies is also contained in the report. Summary tables and charts from this Report are included in Appendix E. Additionally, tern and plover management actions were provided to the Region for inclusion in the 1997-98 AOP.

5. The Corps should map on a periodic basis (at least every three years) all essential tern and plover nesting habitat used by terns and plovers on the Missouri River.

Each field office manually maps nesting habitat each year for inclusion in the Appendix to the annual Report (U.S. Army Corps of Engineers, 1997). This information is entered into the GIS database by year in order to determine long-term trend information. An example of GIS mapping of nesting is included in Appendix H.

Recently, however, mapping efforts have been focused on establishing geographically referenced base maps to use as the foundation for a Habitat Conservation Plan (Plan). National Wetland Inventory (NWI) maps will be used for the base maps in reservoir areas, while digital orthometric imagery will be used as the base map for river reaches.

Digital orthometric aerial photography was done below Garrison Dam and Gavins Point Dam in June of 1996 and the fall of 1997. These flights are currently being compressed and cataloged by the GIS staff at the District to make the files "workable." This database will be used for future mapping. The habitat baseline maps, using information from multiple flights, can be compared to future maps in order to document habitat changes. As these photographs, and future photographs, are entered into the GIS database, habitat will be classified by type. The Region has been assisting the District in the conversion of the digital ortho photographs into maps. Examples of the resulting preliminary maps are contained in Appendix H.

Tern and plover personnel were trained on GIS during 1997. GIS information on nest locations and elevation, and specific habitat use information, can be incorporated into the base maps and tagged to the nest attribute database which was in progress during 1997 (and completed in early 1998).

6. The Corps should continue its "Investigation of Channel Degradation" studies to research the long-term effects of riverbed changes and its impact to tern and plover nesting habitat, forage availability, and forage areas. The results of these studies should be reported each year in the annual report and considered and included as appropriate.

Channel degradation studies are done approximately every ten years, as funding allows, below the main stem dams. Known within the Corps as the Sedimentation Program, the purpose of this program is to systematically assess the operating conditions of the Omaha District reservoirs as they relate to sedimentation issues. The program includes periodic surveying, bed material sampling, analysis to establish trends, and prediction of future conditions (U.S. Army Corps of Engineers, 1998c). The type of information gathered at the permanently-established cross-sections over time can provide insight into the water depths available at a certain discharge; variation in island height, shape, and location; and some information on bank erosion as related to the permanent monuments. This information is supplemented by other Corps efforts, such as the Erosion Studies done below each dam, as well as aerial mapping of the river.

The most recent channel degradation studies done below Garrison Dam were in 1989, and funding is anticipated in 1999 for follow-up studies. Channel degradation studies below Gavins Point Dam, Fort Peck Dam, and Fort Randall Dam were done in 1995, 1992, and 1994, respectively.

During 1997, color aerial photography was done below Garrison, Fort Randall, and Gavins Point Dams as part of the Erosion Study support. These photographs will be used for the 1999 Erosion Study, as well as additional information for the 1999 Sedimentation Study effort below Garrison Dam. Additionally, monument maintenance is scheduled during the interim between the ten-year cross-sectional sampling. Monument maintenance in the degradation reach below Garrison Dam was planned for 1997 and funding requested, but no funds were available for these efforts. However, water surface profiles of the degradation reaches below Fort Peck, Garrison, and Fort Randall Dams were completed during 1997 for discharges of 16,700 cfs, 51,117 cfs, and 59,000 cfs, respectively.

Reasonable and Prudent Measures - Omaha District Responsibilities

The Service considers Reasonable and Prudent Measures as conditions or actions necessary and appropriate to minimize "take." Section 9 of the Endangered Species Act (Act) makes it unlawful for any person to "take" an endangered species. As defined by the Act, the term "take" means "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct" [16 USC 1532(19)]. Further, "harm" is defined to include "an act...[that] may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns including breeding, feeding, or sheltering" (50 CFR 17.3). However, Section 7(b)(4) of the Act permits taking of some individuals of an endangered species, if the taking is incidental to the Federal action under consultation, and such incidental taking is not to the degree that the continued existence of the species is likely to be jeopardized [50 CFR 402.14(i)].

1. All tern and plover nesting habitat on riverine reaches below dams, including the headwaters of Lewis and Clark Lake, as well as reservoir areas during long-term drought, should be monitored (fledge ratios determined) and surveyed (total adult bird count) on a yearly basis during the May through August nesting seasons so that operations of dams may continue in a manner to avoid the unnecessary taking of birds. Long-term drought periods are defined as 2 or more years of equal to or less than 45 million acre-feet of year-end storage with less than median inflows.

The December 1997 Report (U.S. Army Corps of Engineers, 1997) summarizes tern and plover survey and monitoring efforts during 1997. Relevant tables and charts from this Report, especially nest success information, are included in Appendix E.

During 1997, most of the birds on the Missouri River were found below Fort Peck, between Gavins Point Dam and Ponca, Nebraska, and just above the mouth of the Niobrara River. Productivity monitoring is measured in "fledglings per pair" or the number of young birds produced per breeding pair. This ratio is an estimate, since exact fledging rates are impossible to obtain. Details on tern and plover monitoring during 1997 can be found in the annual Report (U.S. Army Corps of Engineers,

1997), and a summary of actions can be found in Appendix E. See also Conservation Recommendation 1 later in this report for information on 1997 monitoring on reservoirs. Figure 6 contains information from reservoir surveying for the purposes of compiling a system average, even though reservoir surveys are a Conservation Recommendation.

Figure 6
Fledge Ratios by Study Reach, 1997

Location	Tern Goal	Tern Actual	Plover Goal	Plover Actual
Fort Peck Lake[1]	0.70	0.00	1.44	0.00
River below Peck	0.70	0.53	1.44	0.89
Lake Sakakawea[2]	0.70	0.00	1.44	0.67
River below Garrison	0.70	0.39	1.44	0.00
Lake Oahe	0.70	0.16	1.44	1.29
River below Ft. Randall[3]	0.70	0.00	1.44	0.00
Lewis and Clark Lake	0.70	1.57	1.44	1.25
River below Gavins Point	0.70	0.90	1.44	0.00
System Total	0.70	0.66	1.44	0.87

[1] minimal habitat available in June; all habitat inundated by July 1
[2] some eggs transferred to captive rearing program to avoid inundation during June
[3] habitat 90% inundated by June 29; surveys ended mid-July due to lack of exposed habitat

Tern fledge ratios for the Missouri River system during 1997 were 94% of the fledge goal established in the Opinion in spite of the high water. The fledge ratio prior to District implementation of the Opinion was 0.45 or 65% of the goal (U.S. Army Corps of Engineers, 1993). The fledge ratio for terns was exceeded at some locations. Plover fledge ratios for the Missouri River system during 1997 were 60% of the fledge goal established in the Opinion in spite of the high water. The fledge ratio prior to District implementation of the Opinion was 0.64 or 44% of the goal.

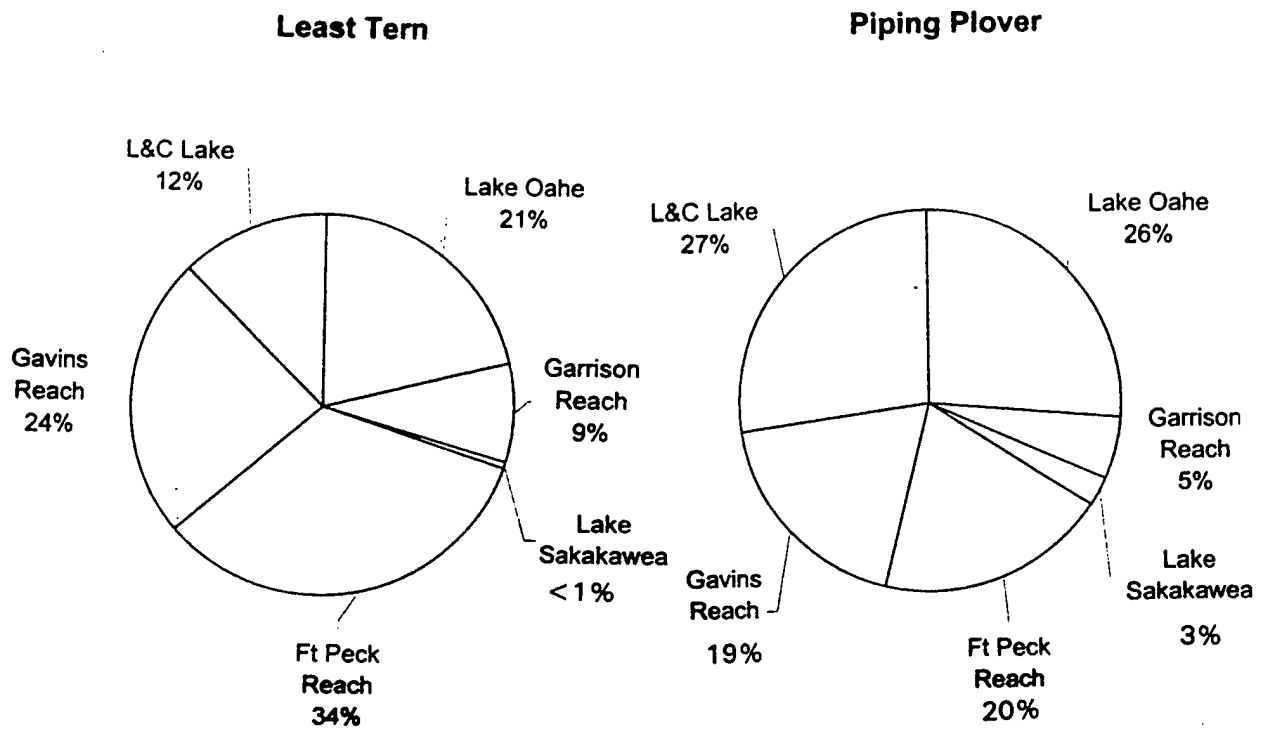
The adult census was conducted during the following timeframes, by study area:

Fort Peck River	June 25 - 27
Garrison River	June 23, July 3
Fort Randall River	July 3
Gavins Point River	June 23 - 24, 26

Figure 7 summarizes adult bird distribution in the Missouri River system during 1997. Study reaches that are not on Figure 7 did not have adult birds reported as a result of monitoring. Reservoir areas are included in Figure 6, even though

monitoring the reservoirs is considered a Conservation Measure during non-drought years.

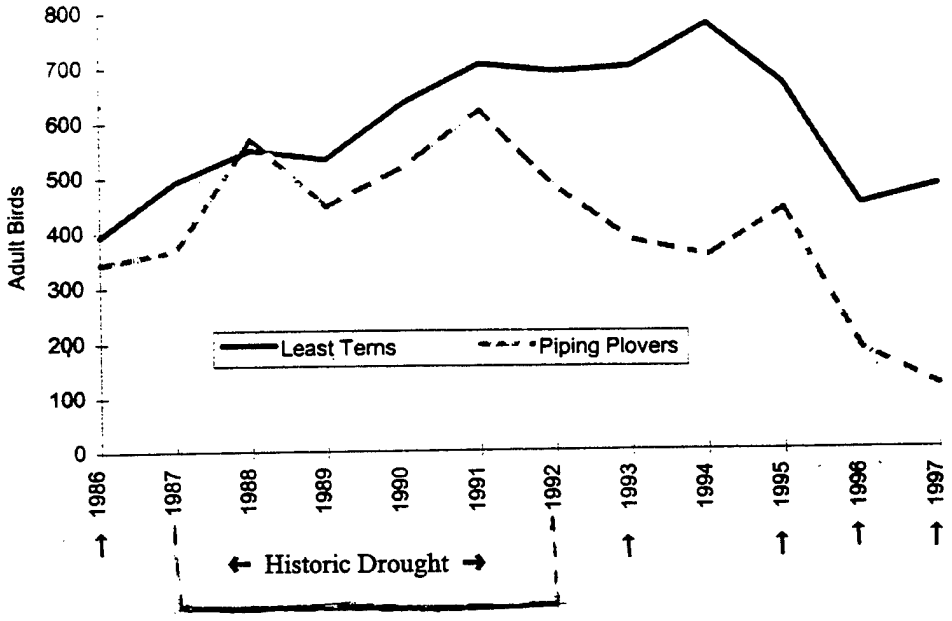
Figure 7
Adult Bird Distribution, 1997



Source: U.S. Army Corps of Engineers, 1997

Figure 8 compares total adult census information by year with annual runoff records (from Figure 2). Although the fledge ratios have increased during the period of record, it may be a result of the low adult bird numbers associated with multiple years of record upper decile inflows since the implementation of the Opinion was begun. During high water, the birds relocate to alternate habitat areas. For example, terns and plovers have recently recolonized portions of the Kansas River, presumably due to inundated habitat in other historic nesting areas (Hanson, personal communication).

Figure 8
Annual Adult Census vs. Annual Runoff, 1986 - 1997



Years with Upper Decile Inflows are indicated by ↑

Source: U.S. Army Corps of Engineers, 1997; U.S. Army Corps of Engineers, 1998b

Monitoring on Corps' reservoirs was not required during 1997, since the Missouri River basin was not in a drought situation (system storage less than or equal to 45 million acre-feet and less than median inflows). Inflows for 1995, 1996, and 1997 were all in the upper decile range, at 37.2, 35.6, and 40.7 million acre-feet respectively. Year-end storage for 1995, 1996, and 1997 was 58.4, 57.8, and 58.9 million acre-feet, respectively (Keasling and Murphy, personal communication).

Training for monitoring and surveying activities occurs annually. During 1997, training for permanent endangered species personnel from all involved projects was held on April 29 - 30. Training for 23 summer employees from five Corps' projects was held at Riverdale, North Dakota on June 2 - 3. Training is conducted by Casey Kruse and Greg Pavelka. Each project also has taped training segments on hand for refresher training.

2. The Corps should continue monitoring daily and hourly fluctuations in releases below all dams or any changes in release due to maintenance or other reasons and use this information in combination with measure 1 above to avoid and minimize take and document unavoidable taking.

Stream gages have been installed on the Missouri River to monitor stream flows during the nesting season and to provide a stage history throughout the season. Information from the gages helps the corps relate the effects of regulation and natural events at intervals along the river. A dynamic flow routing model has been developed to closely predict maximum river stages along the river for different combinations of daily discharge and hourly power peaking characteristics.

Nests were moved to higher elevations in the Missouri River below Fort Peck Dam due to rising stages in the Yellowstone River and the Missouri River below the Yellowstone.

Special flow controls for the terns and plovers are accomplished by the Region annually. These special flows are discussed annually in the AOP.

4. The Corps should implement public information and education programs to increase public awareness and reduce disturbance to nesting birds

Annual press releases, both radio transcripts and Super VHS "ready for TV," are sent out each year prior to the Memorial Day weekend in order to inform the public about the potential for human disturbance through sandbar use. Examples of the radio transcript, and a list of radio and television stations are included in Appendix F.

In addition to the annual PSA's, funding was provided to a non-profit film maker, culminating in the multi-agency funded "A Vanishing Melody: The Call of the Piping Plover." This full-length video was aired on several public broadcasting stations. The District distributed copies of the video to all lake and regulatory offices for use in public awareness activities. Additional copies were sent upon request to libraries, universities, and schools, and is available through interlibrary loan from the District library.

Public awareness is often done by the field offices in the form of campfire talks. For example, the Fort Peck office staff provided tern and plover campfire talks and showed the video "A Vanishing Melody" during the recreation season. The Gavins Point office staff also gave an interpretive program on terns and plovers at the White Crane Campground in July, 1997. Lake Oahe provides a station on terns and plovers at the annual Eco-Meet during September. The Eco-Meet is an activity of approximately 300 4th and 5th grade students.

Informational full-color endangered species posters, including information on terns and plovers, are posted annually at select river access locations. Posters and

information on terns and plovers were also distributed by the Oahe office to local teachers upon request.

Permanent signs are also placed at the most heavily-used river access locations within the tern and plover nesting range.

Coloring books developed during 1996 were distributed to the general public, schools, and other agencies during 1997. Coloring books and pamphlets were available at the visitor centers and powerhouses at Fort Randall and Gavins Point from May through September.

Tern and plover placemats were distributed to local eating establishments by the Fort Randall field office.

The "tern and plover slide show" on the Environmental Branch, Planning Division, District homepage received numerous "hits" during 1997. The slide show is presented in Appendix F.

Preparations were begun for the 1998 Tern and Plover Symposium, co-sponsored by the Omaha District Corps of Engineers. Tern and plover staff spent considerable time during 1997 planning for the Symposium, including meeting with other organizers making arrangements, reviewing submitted papers, and presenting technical papers on Corps' tern and plover activities.

Casey Kruse gave presentations on the captive rearing program to the following groups:

- the North Dakota Chapter of the Wildlife Society in Bismarck, ND during February, 1997.

- the South Dakota Chapter of the Wildlife Society in Rapid City, SD during March, 1997.

Casey Kruse met with representatives of the University of Wisconsin and the U.S. Fish and Wildlife Service to discuss a captive rearing graduate study proposal during March and May, 1997. Casey Kruse also gave a presentation on endangered species to 75 second-grade students at Lincoln Elementary School in Yankton, SD. Casey Kruse and Robyn Niver gave presentations at the MRNRC meetings in Nebraska City, NE during June, 1997. Casey Kruse met with officials from Saskatchewan Water Corporation and attended the Prairie Canada Piping Plover

Recovery Team meeting in Saskatchewan to discuss piping plover, wildlife, and hydropower issues.

Public awareness activities are summarized by office in Figure 9.

Figure 9
1997 Public Awareness Activities by Office

Office	Campfire Talks	Posters/ Color book	Permanent Signs	PSA's/ Media	Video	Other
Peck	X	X	X		X	
Garrison			X			
Oahe		X	X	X		
Randall		X	X			X
Gavins	X	X	X	X	X	X
Omaha		X		X	X	X

Conservation Recommendations

Section 7(a)(1) of the Act directs Federal agencies to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Although such conservation recommendations are not required, they are recommended to help the recovery of the species. Conservation recommendations were not assigned to the Omaha District by the Region, but are implemented as time and funding allow.

1. Reservoir populations of least terns and piping plovers should be monitored and surveyed each year rather than just during drought periods (see Reasonable and Prudent Alternative 1). This information will help evaluate the System as a whole. Subsampling techniques to obtain statistically valid monitoring surveys are acceptable.

Adult bird census was conducted on the Missouri River reservoirs as indicated below:

Fort Peck Lake	June 26
Lake Sakakawea	June 24 - 27
Lake Oahe	June 30, July 7 - 9, July 11
Lewis and Clark Lake	June 27, 30

Surveying was done on all lakes, except Lake Peck, through the end of the nesting season in mid-August in spite of high water levels. Surveys on Lake Peck were suspended by July due to inundation of all tern and plover habitat on the lake. Surveys on the other reservoirs focused on exposed habitat, since much of what was historically available was under water. Survey and monitoring results can be found in Appendix E.

2. Any maintenance dredging operations or dredging permits on the Missouri River should be evaluated by the Corps, in consultation with the Service, for creating tern and plover habitat. Where habitat creation is possible, the Corps will implement actions necessary to create habitat from dredged material.

No dredge permits were issued during 1997, presumably due to the high water.

3. The Corps should strive to meet Missouri River recovery goals for terns and plovers (800 tern adults for 10 years and 970 adults for 15 years) by implementing additional tern and plover management actions, beyond the scope of the reasonable and prudent alternatives, that would further increase productivity.

Captive Rearing. The Corps' captive rearing program was established to increase production of terns and plovers during high-water years. When record high water threatened to inundate eggs, the Corps, in coordination with the Service, initiated egg collection, brooding, hatching, and chick-rearing in order to minimize production losses. Eggs that are likely to be inundated due to rising river stages or reservoir elevations, or the need to discharge waters approaching the maximum spillway level, are collected and transported to the captive rearing facility at the Gavins Point project office for incubation. During 1997, eggs were collected from the Missouri River below Garrison Dam, and from Lake Sakakawea. Figure 10 summarizes 1997 captive rearing information.

Figure 10
1997 Chick Rearing Success Rates

	Piping Plovers				Least Terns			
	Collect	Hatch	Release	Re/Hat	Collect	Hatch	Release	Re/Hat
Lake Sakakawea	31	26	24	92%	10	9	7	78%
Garrison Reach	2	0	0	0%	16	10	9	90%
Total	33	26	24	92%	26	19	16	84%

Source: U.S. Army Corps of Engineers, 1997

Authority for egg collection was provided by Subpermit 93-07 of Permit PRT-704.

Least tern survivability was enhanced in 1997 due to the construction of a new flight pen. Photographs of pen construction and use by the terns, banding of captive raised birds, and subsequent release into the wild are contained in Appendix G. A banding report was completed and sent to the USGS-BRD Bird Banding Laboratory in Maryland during February of 1997.

Sixteen of the captive raised plovers were released at the Bowdoin National Wildlife Refuge in Montana. Sixteen terns and eight plovers were released on the Niobrara River in Nebraska. All releases occurred in August.

Captive Rearing Survivability Study. A three-year study was developed with the University of Wisconsin which will determine the survival of both wild-reared and captive-reared piping plovers. Field research will begin during the summer of 1998. In preparation for the study, equipment acquisition, transmitter design, and technique development were accomplished during 1997.

Sign Posting. To prevent loss of nests or chicks due to human disturbance, nest sites near recreation areas were posted with signs, and sometimes fenced as well, restricting access. Island areas were posted and fenced in the Lake Sakakawea area, the Lake Oahe area, and the Gavins Point river reach.

Removal of a fence, and the removal of a predator exclusion cage (and the four eggs the cage was protecting) occurred in the Indian Creek boat ramp parking lot in the Lake Oahe area. Additionally, signs were stolen and the eggs removed from a caged plover nest on an island at RM 801.

Predator Control. Five great horned owls were captured in pole traps set on Dredge Island in upper Lake Oahe. The owls were turned over to the Service. Predator exclusion cages were used on plover nests to prevent predation. Three live traps were set up in the Missouri River below Garrison Dam, but produced no predators.

Nest Relocation. Nests were relocated to higher elevations to avoid inundation or to avoid high public use areas. Nest relocation occurred in the Missouri River below Fort Peck Dam and Gavins Point Dam, as well as within Lake Sakakawea and Lake Oahe.

Niobrara Study. The second year of the Niobrara Study was completed in 1997. The purpose of the study is to determine what characteristics of sandbar islands attract terns and plovers for nesting. The study area includes four reaches of the Niobrara, totaling 50 miles. During 1997, 133 tern nests and 68 plover nests were found, with nest success at 44.9% and 39.7%, respectively.

IV. SUMMARY AND CONCLUSIONS

The District has implemented all assigned tasks from the Opinion during 1997, even though high water limited the amount of nesting habitat available for the terns and plovers. Figure 11 summarizes the requirements of the Opinion and 1997 Corps actions that demonstrate that these requirements were met.

Figure 11
1997 District Execution of Required Tasks

Opinion Tasks	Met?	Corps' Actions
Alt. 1b - habitat creation	yes	Steinke Bay; high flows
Alt. 1c - high flow habitat	yes	below Fort Peck; Lake Audubon
Alt. 2 - mgt goals in AOP	yes	plans in 1996-97 AOP
Alt. 3 - annual report	yes	in 1997-98 AOP and 1997 Annual Report
Alt. 5 - map nesting habitat	yes	digital ortho flown; maps begun (mapping is a multi-year effort)
Alt. 6 - channel degradation study	yes	continuing existing studies
Meas. 1 - survey and monitor	yes	river reaches monitored and surveyed as long as habitat was above water
Meas. 2 - monitor flow fluctuations	yes	gage information factors into flow decisions from RCC
Meas. 4 - public awareness	yes	press releases, public and agency talks, videotape funding and distribution, posters and coloring books, co-sponsor for upcoming Tern and Plover Symposium

In addition to the above tasks, the District also implemented Conservation Recommendations during 1997, as indicated in Figure 12. Conservations Recommendations are not requirements, but Federal agencies should, in good faith, do what can be done to speed the recovery of listed species.

Figure 12
1997 Execution of Conservation Recommendations

Conservation Tasks	Met?	Corps' Actions
1 - survey and monitor reservoirs	yes	all reservoirs monitored and surveyed
2 - review dredge permits	N/A	high water prevented dredging actions during 1997
3 - actions to increase productivity	yes	eggs were collected; chicks raised, banded, and released; additional studies on Niobrara and Yellowstone Rivers funded

The commitment of the District to implement the Opinion, even during 1997's record inflows, is apparent when reviewing the weekly surveying and monitoring reports (see Appendix E). Surveys were continued in all reaches and reservoir areas until 100% of the habitat was inundated. Additionally, nests were relocated, and, as a last resort, eggs were collected for captive rearing, successfully fledging both terns and plovers.

The implementation plan for the Biological Opinion (the Red Book) and the Opinion were both developed while the Missouri River system was recovering from a severe drought situation. Since then, the Missouri River system has gone undergone severe flooding conditions due to record inflows, entering into a period of high water and flooding which prevailed during the mid 1990's. High water limited habitat development, and called for unanticipated tasks not described in the Red Book or the Opinion. A new implementation plan is being developed for use in the future which will take into account varying hydrological conditions.

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APPENDIX A

BIOLOGICAL OPINION

Reasonable and Prudent Alternatives

Reasonable and prudent alternatives are defined as "alternative actions, identified during formal consultation, that can be implemented in a manner consistent with the intended purpose of the action, that can be implemented consistent with the scope of the Federal Agency's legal authority and jurisdiction, that are economically and technologically feasible, and that the Service believes would avoid the likelihood of jeopardizing the continued existence of listed species or result in the destruction or adverse modification of critical habitat."

As mentioned previously, the Missouri River is a dynamic system. Extremes can vary from years of very high inflow and high storage to years of low inflow and low storage. In the years since the least tern and piping plover have been listed (1986 to 1989), water flows have fluctuated greatly, from a high-water year in 1986 to extreme drought in 1989. The dynamics of the Missouri River system are such that management plans (Operating Plans) must be evaluated every year to adjust to system conditions.

The dynamics of the Missouri River and associated sandbar habitat appear to influence tern and plover population sizes. Analysis of piping plover and least tern population fluctuations in North Dakota indicate that these birds are limited by the amount of total available sandbar acreage. Fewer least terns and piping plovers nested on the Missouri River below Garrison Dam during years of high maximum June discharge and subsequently reduced sandbar acreage. Conversely, more terns and plovers nested on the Missouri River in years when June discharge rates were lower and hence allowed for greater sandbar acreage. These trends indicate that nesting terns and plovers are limited by habitat availability.

Colony site turnover rates refer to the annual rate at which birds abandon former nesting sites and pioneer new sites for nesting. Colony turnover rates provide an index of colony stability. High turnover rates indicate low-site stability and may be a function of predation rates, human disturbance, changes in habitat characteristics (i.e., vegetation encroachment, flooding, erosion, etc.), and/or other unknown variables (Cuthbert 1988). Colony turnover rates among nesting least terns and piping plovers on the Missouri River in both North and South Dakota are large (Schwalbach et al. 1988; Mayer and Dryer 1989) when compared to colony turnover rates of coastal or wetlands populations (Burger 1984; Kotliar and Burger 1986; Cuthbert 1988; and Wiens and Cuthbert 1988). Habitat changes caused by System operations contribute to Missouri River colony site instability.

In order for System operations to avoid jeopardy to the interior population of the least tern and the Plains population of the piping plover, management steps must be taken to address the quantity and quality of habitat. Fledge ratios (i.e., the number of juveniles produced annually per nesting pair) are an estimate of productivity. The best scientific information available suggests

that fledge ratios of 0.70 and 1.44 for terns and plovers, respectively, will maintain a stable population on the Missouri River. The Service believes that, if these fledge ratios are met each year, the Corps will avoid the present jeopardy situation. Fledge ratio estimates shall be based on statistically defensible samples of nesting birds and be representative of productivity for the entire Missouri River population (i.e., samples for fledge ratios should give consideration to the total number of birds (pairs), the total number of colony sites on the entire Missouri River, and the different river reaches (Mayer and Dryer 1988)). The Corps must take the necessary management steps to address quantity and quality of habitat so that fledge ratios are met or exceeded in order to maintain a stable Missouri River population.

The habitat area available to nesting birds may best be described as the scour area which is the area between the mean high and mean low river levels. Although habitat of Missouri River terns and plovers has not been fully evaluated, indications are that most birds nest within the scour area. Nesting habitat characteristics found to be important on the Missouri River, as well as on other river systems, include elevation of nest above river level, substrate, percent vegetative cover, average vegetation height, and distance to forage areas (Dryer and Dryer 1985; Schwalbach 1988). Providing a predator-free and human disturbance-free colony site is also important to productivity of nesting birds.

Optimum habitat may best be described as a complex of side channels and sandbars with the proper mix of habitat characteristics required by the birds. Such sandbar complexes provide regularly scoured habitat for nesting and shallow pools for foraging. Single, large sandbars rarely provide these conditions because they often remain above the scour zone and because the associated channels and side channels are deep and provide little opportunity for foraging. Additionally, mammals sometimes reside on large sandbars and in turn may prey upon nearby tern or plover nests and chicks. Hence, it is important to produce many sandbar complexes rather than a few, large, isolated sandbars. Also, by creating many sandbars distributed evenly throughout the Missouri River System, impacts on the total population would be reduced because devastation of a single colony would represent a much smaller relative loss to the total population. Methods to increase the nesting habitat area available and to enhance habitat characteristics will be necessary to maximize production in order to meet necessary fledge ratios.

Therefore, to preclude jeopardy, it is the Service's scientific judgment that the significant impacts of System operations on terns and plovers need to be eliminated by implementing all of the following alternatives delineated below. These alternatives act together as a functional unit and must be fully implemented as soon as possible to ensure the continued existence of the interior population of the least tern and the piping plover.

1. The Corps should continue to select and schedule flows from main stem dams prior to the least tern and piping plover nesting season (May through August), and other times of the year, as appropriate, in order to meet the needs of the species.

a. Operational-caused flooding of nests or habitat should be avoided during the nesting season. Therefore, flows during the nesting season will be set by nest initiation. Once nests have been initiated, flows should not be increased to imperil nests.

b. Natural nesting habitat should be provided as a priority and other management actions implemented to meet or exceed fledge ratio goals (i.e., 0.70 for terns and 1.44 for plovers).

For example, based on the best year of record (1987) for fledge ratios (0.67 for terns and 1.13 for plovers) below Gavins Point Dam, there were 31 nesting sites with a mean size of 8.13 acres. If additional management actions were taken to enhance habitat criteria (as defined below), fledge ratio goals of 0.70 for terns and 1.44 for plovers could be met. (This example only illustrates possibilities on the Gavins Point reach. Fledge ratio goals are to be met for the entire Missouri River population.)

While the Service can illustrate the best year for the Gavins Point reach because we have the information on hand, we do not have the habitat information needed so that projections for the best years in other reaches can be made. However, the Corps has the capability, available photography, flow data, and cross-sectional information necessary to determine available habitat. Therefore, the Corps should, based in part on past years' information, determine the habitat necessary for each river reach and provide management actions within the Corps' authorities to meet or exceed fledge ratios. Under Section 7(a)(1) of the Endangered Species Act, the Corps shall utilize their authorities by carrying out programs for the conservation of endangered and threatened species.

The Corps should use the following parameters when determining habitat and management actions needed to meet or exceed fledge ratios. The following describe some ideal conditions and the Corps should strive to meet these conditions in order to meet fledge ratio goals.

(1) Proximity to Forage Habitat - Tern nesting areas should not be greater than 400 meters from an area that provides schooling and feeding fish that are 3 inches in size. Plover nesting areas must include forage areas (i.e., sandbar flats) as a part of the sandbar nesting complex.

(2) Substrate - Nesting/breeding habitat should consist of very fine to fine sand which is the preferred nesting substrate for terns and plovers. Some gravel is tolerated by plovers since they use it as nest-lining material.

(3) Vegetation (i.e., at nest initiation) - Percent cover for nesting should be no greater than 25 percent. Optimum percent cover is 10 percent or less. Vegetation height should be less than 10 centimeters.

(4) Elevation of Nest Above River Level - Nesting areas should be 8 inches or greater above river levels. This will protect nests by allowing for the 2-inch nest depth, any 4-inch rise caused by wind or weather, or other actions that may cause the river to rise in addition to operations. Data collected on the Missouri River shows that, given the opportunity, the majority of birds will nest at 8 inches or greater. However, birds will nest at elevations less than 8 inches, particularly on newly formed (i.e., low elevation) islands. For nests initiated at less than 8 inches (i.e., on sandbars/islands where the 8-inch rule cannot be met), the 8-inch rule will not apply. However, flows should not be increased in order to protect these nests.

(5) Disturbance-Free Area - Nesting areas should be substantially free from both predation and human disturbance. The Corps should take necessary actions to reduce or eliminate predation and human disturbance during nesting periods.

c. Due to short-term and long-term adjustments, the Corps cannot make changes in operations to compensate for terns and plovers in all years (e.g., years of high storage and high inflows). When flows below main stem dams may inundate much nesting habitat, other means will be necessary to establish nesting habitat to meet fledge ratio goals. Created habitat should be established to accommodate the following release flows by river reach and to supplement natural habitat required by alternative 1(b) above.

Fort Peck--above 8,500 cfs and below 13,200 cfs
Garrison--above 18,000 cfs and below 31,000 cfs
Fort Randall--above 28,000 cfs and below 38,500 cfs
Gavins Point--above 30,000 cfs and below 39,500 cfs

The created habitat should follow the habitat parameters listed above in 1(b)(1) through 1(b)(5). Acceptable management techniques for habitat creation include (1) replenishment or nourishment of sandbars and islands with a dredging operation to create areas above anticipated high river levels; (2) creation of suitable high elevation nesting habitat (i.e., above river levels) by mechanical (i.e., dredging or clearing) or structural means, such as chevron wing dikes and jetties; (3) creation or enhancement of shallow and backwater areas, off-channel chutes, and flats as foraging habitat; (4) scouring of island and sandbar habitats with high flows prior to nesting season; and (5) use of Schwimmkampen type system (Hoeger 1988) for artificial islands.

2. Prior to implementing tern and plover management strategies for each operating year, the Corps should demonstrate to the Service's Field Supervisor, North Dakota-South Dakota Field Office, that the planned System operations and tern and plover management strategies will satisfy reasonable and prudent alternatives, reasonable and prudent measures, and strive to meet fledge ratio goals. The Corps should provide this information to, and/or meet with, the Service during development of the draft Annual Operating Plan in the fall and after March 1 when the runoff forecast is made. We anticipate that this will provide enough time to plan or implement operational scenarios that will be necessary for the new operating season.

3 The Corps should compile a separate annual report by December 31 of each year or include in the Annual Operating Plan a report outlining tern and plover management actions, including reasonable and prudent alternatives and reasonable and prudent measures implemented during the operating year, their success in attaining fledge ratio standards and meeting habitat needs, and anticipated actions for the upcoming year. The purpose of this report is to provide the Service and the Missouri River Tern and Plover Management Team the information necessary to evaluate the effectiveness of the Corps' actions. Monitoring information in the report should include:

a. Tern and plover fledge ratios;

b. Tern and plover population survey results;

c. Nest elevations;

d. Mapping of nesting habitat, including changes in sandbar morphology during the tern and plover nesting season;

e Estimates of sandbar acreages as modeled by the Corps' cross-sectional data (provided at least every 3 years with updates on the data collection included in the Annual Report); and

f. Historic hourly release data from all dams, including water levels for all reaches for the May 1 to August 30 season.

Further details on items a through f above are found later in this report under "Terms and Conditions for Implementation of Reasonable and Prudent Measures."

4. The Corps should form a Missouri River Tern and Plover Management Team (Team). The Team will consist of Federal and State wildlife agencies. These agencies will be contacted to verify their willingness to participate. The annual report (see Reasonable and Prudent Alternative 3) will be provided to this Team (by December 31 of each year). The Team will review the annual report and provide management views to the Corps

for the following operating season. The Team will meet shortly after March 1 of each year to provide views to the Corps. The Corps will be responsible for scheduling and arranging the Team meetings. Since agency involvement will be voluntary, the Corps will not be responsible for funding other agency participation.

5. The Corps should map, on a periodic basis (at least every 3 years), all essential tern and plover nesting habitat, used by terns and plovers, on the Missouri River as identified in appendix 1 and the recovery plans. This information can, in part, be obtained from cross-sectional information the Corps uses in its hydrology studies and bird-monitoring studies since 1986. The mapping information, in conjunction with the Corps' Satellite Data Collection and Synthetic Modeling (as described in Corps 1989a and 1989b), can be used to determine tern and plover habitat available under different operating scenarios and can be used to assist in establishing and implementing management actions that need to be carried out to meet fledge ratio goals. Mapping products or updates on data collection will be provided in the annual report (see Reasonable and Prudent Alternative 3).

6. The Corps should continue its "Investigations of Channel Degradation" studies to research the long-term effects of riverbed changes and its impact to tern and plover nesting habitat, forage availability, and forage areas. The results of these studies should be reported each year in the annual report and considered and included as appropriate.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. The following will further the conservation of least terns and piping plovers on the Missouri River.

1. Reservoir populations of least terns and piping plovers should be monitored and surveyed each year rather than just during drought periods (see terms and conditions to implement Reasonable and Prudent Measure 1). This information will help evaluate the System as a whole. Subsampling techniques to obtain statistically valid monitoring surveys are acceptable.

2. Any maintenance dredging operations or dredging permits on the Missouri River (Section 10/404 of the Clean Water Act) should be evaluated by the Corps, in consultation with the Service, for creating tern and plover habitat. Where habitat creation is possible, the Corps will implement actions necessary to create habitat from dredged material.

3. The Corps should strive to meet Missouri River recovery goals for terns and plovers (800 tern adults for 10 years (USFWS 1989a) and 485 plover pairs (970 adults) for 15 years (USFWS 1988b)) by implementing additional tern and plover management actions, beyond the scope of the reasonable and prudent alternatives, that would further increase productivity (i.e., as indicated by increases of fledge ratio goals).

The Service requests notification of the implementation of any conservation recommendations by the Corps. This courtesy will keep us informed of conservation and recovery actions. Additionally, this will assist the Service and the Corps in making a determination concerning the need for Endangered Species Act Section 10 permits. Section 10 permits are necessary for scientific purposes and enhancement of propagation or survival of listed species (i.e., monitoring and management actions for terns and plovers).

INCIDENTAL TAKE

Section 9 of the Act makes it unlawful for any person to "take" an endangered species. As defined by the Act, the term "take" means "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct" (16 U.S.C. 1532(19)). Further, "harm" is defined to include "an act . . . [that] may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns including breeding, feeding, or sheltering" (50 CFR 17.3). However, Section 7(b)(4) of the Act permits taking of some individuals of an endangered species, if the taking is incidental to the Federal action under consultation, and such incidental taking is not to the degree that the continued existence of the species is likely to be jeopardized (50 CFR 402.14(i)).

The Service has determined that System operations will result in an incidental take of zero for bald eagles. The incidental take for terns and plovers is the amount or extent of anticipated take after the reasonable and prudent alternatives are implemented. For reasons discussed below, incidental take of least terns and piping plovers likely will occur as a result of direct or indirect effects.

Piping plovers and least terns may begin incubation as early as mid-May, but the incubation period begins principally from early to mid-June. Nest initiation by the birds lasts 1 to 2 weeks and is followed by a 25- to 29-day incubation period. Fledging occurs approximately 21 to 26 days after hatching. Renesting may occur such that the birds may not fledge until late August. Thus, the nesting season extends from nest initiation around May 1 until fledging around August 31. Although the Corps has included tern and plover management considerations in the operating plan during the nesting season since 1986, nests and chicks have still been lost (Schwalbach 1988; Mayer and Dryer 1988; Dirks and Higgins 1988; USFWS 1989b). Therefore, it is anticipated that, even after implementation of reasonable and prudent alternatives, a loss of

birds during the nesting season may occur. While the reasonable and prudent alternatives are designed to avoid jeopardy to the species, losses may be expected because of unanticipated effects of operational changes, human error, or acts of God, such as wind and flood. The following types of unavoidable losses are possible:

1. Taking of eggs and flightless young by flooding or erosion. This has been documented below Gavins Point, Fort Randall, and Garrison Dams;

2. Precluding nesting and renesting of terns and plovers by inundation of or wetting of sandbar, islands, or shoreline nesting habitat. This has been documented below all dams and on reservoirs;

3. Increasing predation on nests, chicks, and adults as a result of reduced nesting habitat or changes in predator/prey relationships;

4. Increasing susceptibility of eggs and young to disturbance and/or destruction by human activities as a result of reduced nesting habitat; and

5. Continued loss of habitat due to degradation and vegetative encroachment.

Having made the determination that incidental take is likely to occur, the Service must provide a statement that specifies the following:

1. The impact (i.e., amount or extent) of anticipated take that will not violate Section 7(a)(2);

2. The reasonable and prudent measures necessary to minimize the amount or extent of incidental take;

3. The terms and conditions, including reporting requirements, that must be complied with by the Corps in order to implement the reasonable and prudent measures; and

4. The procedures to be used to handle or dispose of any individual least tern or piping plover actually taken.

Amount or Extent of Incidental Take

The Service anticipates that, even if reasonable and prudent alternatives are successfully implemented, a minimal amount of incidental take of least terns and piping plovers will occur directly or indirectly as a result of System operations. This take may be in the form of killing, harming, and harassing which includes loss of habitat, loss of individuals, and loss to recruitment.

The amount of anticipated take likely to occur is unpredictable because it is difficult, if not impossible, to determine if take will always be the result of System operations, other outside System influences, or a combination of actions. Therefore, determination of a specific amount of take is not possible.

We believe the implementation of the reasonable and prudent alternatives will avoid the likelihood of jeopardizing the continued existence of the interior population of the least tern and the Plains population of the piping plover. Additionally, the implementation of the reasonable and prudent measures will minimize the amount or extent of incidental take. In other words, any incidental take that may occur should be offset by the implementation of the reasonable and prudent alternatives and reasonable and prudent measures. Therefore, the Service has determined that the extent of take resulting from the Corps' action or inaction that is not likely to jeopardize the species is that take which will not cause the fledge ratios to drop below 0.70 (terns) and 1.44 (plovers) during a given nesting season. In making the determination, if the results stem from the Corps' action or inaction, the Service will confer with the Management Team. While fledge ratios are based on the best scientific information available, new information may be presented in future years which may necessitate a reconsideration of fledge ratio goals as set above. If new information does become available that reveals effects of the action that may affect the species in a manner or to an extent not previously considered, Section 7 consultation must be reinitiated.

Authorization for incidental take under Section 7 of the Endangered Species Act is not an authorization for take under the Migratory Bird Treaty Act or the Bald and Golden Eagle Protection Act.

Reasonable and Prudent Measures

The Service considers the following reasonable and prudent measures with their implementing terms and conditions to be actions necessary and appropriate to minimize take.

1. All tern and plover nesting habitat on riverine reaches below dams, including the headwaters of Lewis and Clark Lake, as well as reservoir areas during long-term droughts, should be monitored (fledge ratios determined) and surveyed (total adult bird count) on a yearly basis during the May through August nesting season so that operations of dams may continue in a manner to avoid the unnecessary taking of birds. Long-term drought periods are defined as 2 or more years of equal to or less than 45 million acre-feet of year-end storage with less than median inflows.

2. The Corps should continue monitoring daily and hourly fluctuations in releases below all dams or any changes in release due to maintenance or other reasons and use this information in combination with measure 1 above to avoid and minimize take and document unavoidable taking.

3. The Corps should continue to evaluate operational changes that may be used to avoid take.

4. The Corps should implement public information and education programs to increase public awareness and reduce disturbance to nesting birds.

Terms and Conditions for Implementation of Reasonable and Prudent Measures

In order to be exempt from the prohibitions of Section 9 of the Act, the Corps must comply with the following terms and conditions that implement the reasonable and prudent measures. The Corps is responsible for the funding and means to carry out all reasonable and prudent measures.

Reasonable and Prudent Measure 1 - Productivity and population surveys on reaches below dams shall be conducted each year. Reservoirs shall be surveyed during drought years (less than 45 million acre-feet of year-end storage with less than median inflows) to monitor birds that pioneer exposed reservoir shoreline areas and thus provide accurate estimates of system-wide productivity and population sizes. For example, during the severe drought of 1988 and 1989, 13 percent of least terns and 39 percent of piping plovers nesting within the Missouri River system were found above system dams. Had these birds not been accounted for, population sizes and productivity rates would have been grossly inaccurate.

Population survey information will include (1) the total number of colonies, (2) the total number of birds, and (3) mapping of habitat used by birds (i.e., general location map of colony sites and acreage determination).

Productivity (i.e., nesting and fledge success) estimates will be based on subsamples of the nesting population in each river reach. Consideration in determining subsamples will be given to total number of birds, total number of colony sites, and habitat characteristics. Monitoring information from subsamples will include (1) the total number of nests, (2) the total number of fledged birds per nesting pair and causes of nest and chick loss, and (3) elevation of nests above water levels and distance to water's edge. Calculations for the fledge ratio standard will be a weighted average for the entire river based on the number of pairs.

Survey and monitoring information, in conjunction with the Corps' Satellite Data Collection (as described in Corps 1989a and 1989b), can be used to develop management plans that will avoid taking of birds during the nesting season as well as determine if fledge ratios are met as described in the reasonable and prudent alternatives and requirements for reinitiation of consultation. With such a monitoring program in place, the Corps will know when and how operations may result in take as well as be able to avoid take.

Annual Report - In regard to Reasonable and Prudent Measures 1 through 3, in addition to those items identified in Reasonable and Prudent Alternative 3, the Corps will include the following in the annual report:

1. Any taking, including loss of eggs, chicks, adults, and habitat, that occurred, including reasons for take and actions to avoid take; and

2. Evaluation of operational efforts to avoid take (habitat and birds).

The above information may be placed in the Corps' Annual Operating Plan.

Reasonable and Prudent Measure 2 - All incidences of take must be documented and immediately reported to the Service (see above annual reporting requirements).

Reasonable and Prudent Measure 3 - If the Corps develops new operational scenarios that were not considered during this consultation, then consultation for these new actions will need to be reinitiated (see above annual reporting requirements).

Reasonable and Prudent Measure 4 - The following actions will be taken to implement this reasonable and prudent measure.

1. Production of a Public Service Announcement (radio release and television video) informing the public of terns and plovers on the river. The Public Service Announcement shall be distributed to radio and television stations within the States bordering the Missouri River to be used at least from May through August. The video shall be available for public use and used in the Corps' project office interpretive programs.

2. The Corps' project offices will engage in intensive public relations efforts for tern and plover conservation to take place on Corps' land, including but not limited to displays, video productions, naturalist talks, information flyers or brochures, information placed in campground notices, and informational posting of boat ramps.

3. Provide personnel and assistance to work jointly with the States and the Service on adequate posting and roping of all nesting areas on the Missouri River. State and Service personnel will each year coordinate efforts with the Corps and determine each agency's level of participation.

Procedures for Handling or Disposing of Least Terns and Piping Plovers

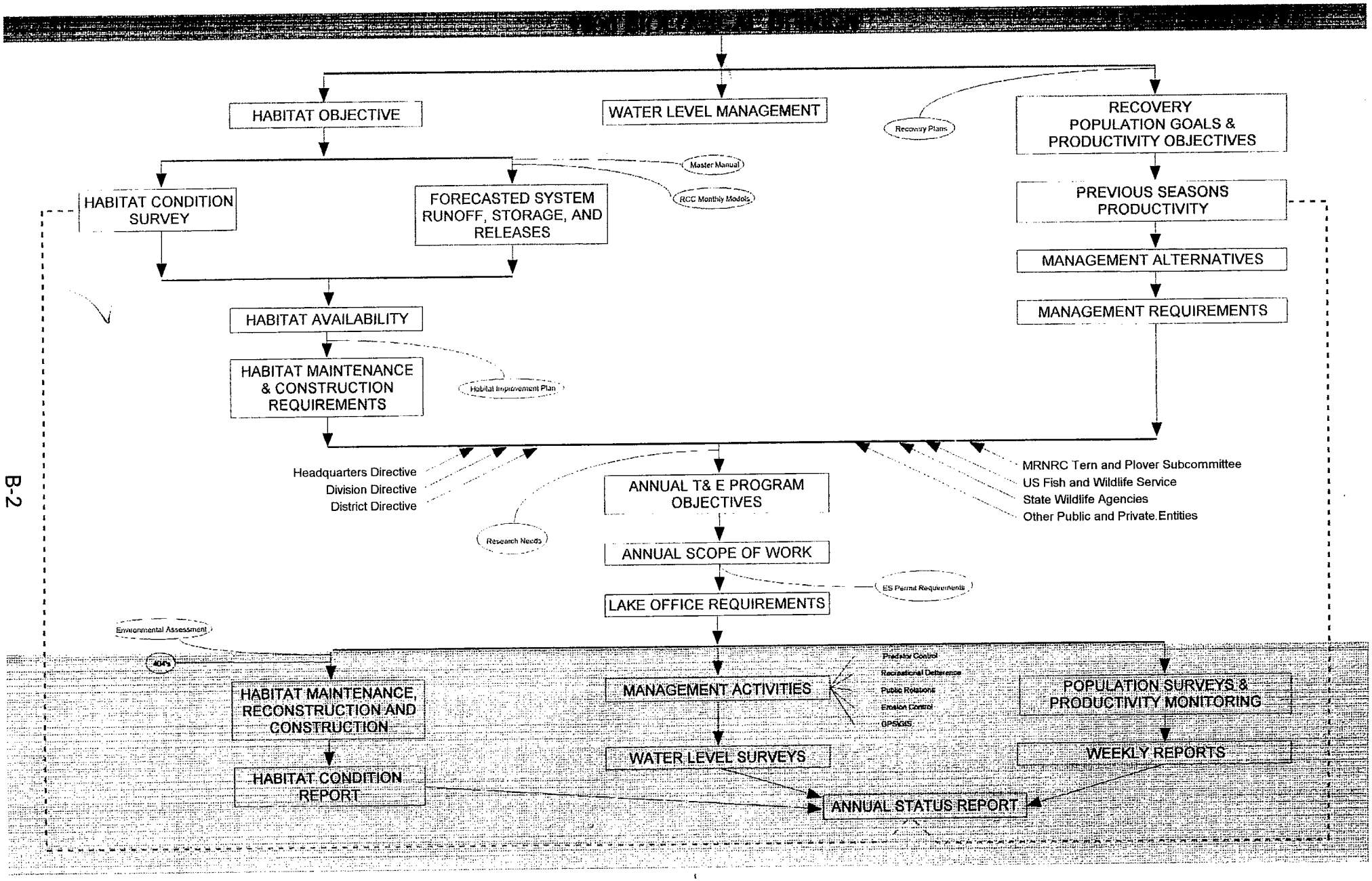
All eggs, chicks, or adults of least terns and/or piping plovers found dead on the Missouri River will be immediately (within 24 hours) reported to the North Dakota-South Dakota Field Office or a law enforcement agent of the Service for instructions on proper disposal.

APPENDIX B

FY 97 PLANS AND SUMMARY OF ACCOMPLISHMENTS

01/18/95

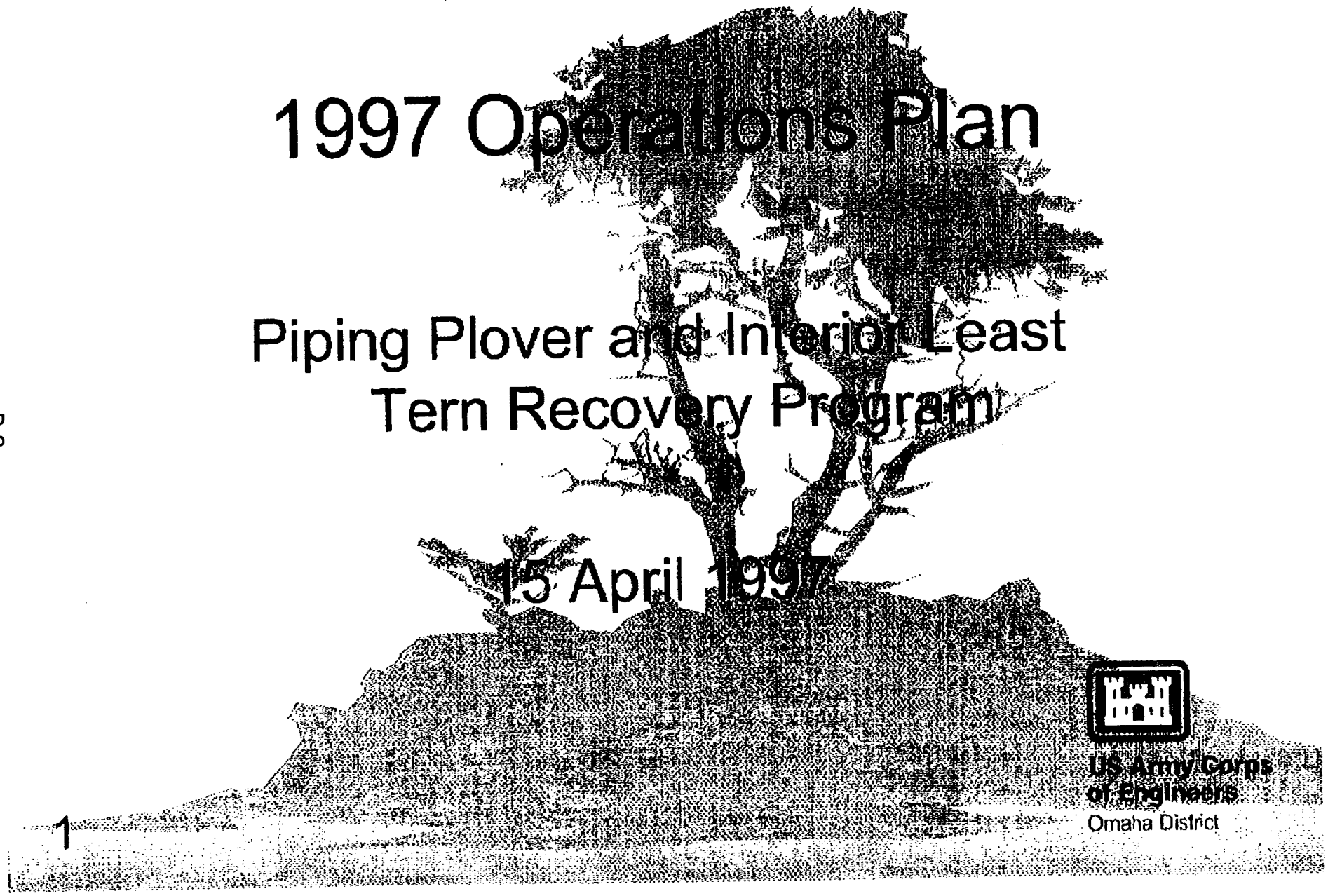
THREATENED AND ENDANGERED SPECIES PROGRAM PLANNING PROCESS



MISSOURI RIVER DIVISION RESPONSIBILITY

OMAHA DISTRICT RESPONSIBILITY

LAKE OFFICE RESPONSIBILITY



1997 Operations Plan

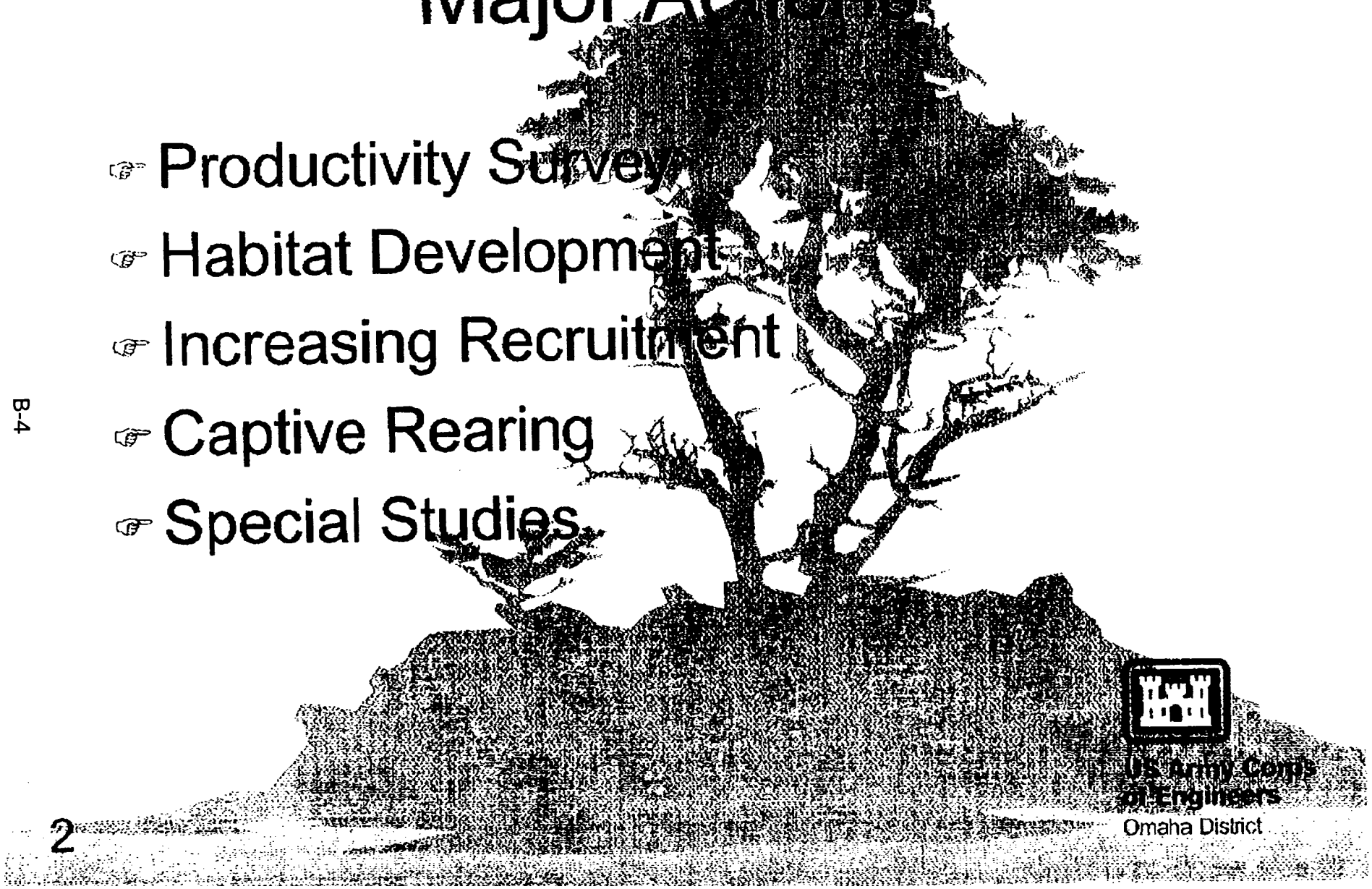
Piping Plover and Interior Least Tern Recovery Program

15 April 1997

US Army Corps of Engineers
Omaha District

Major Actions

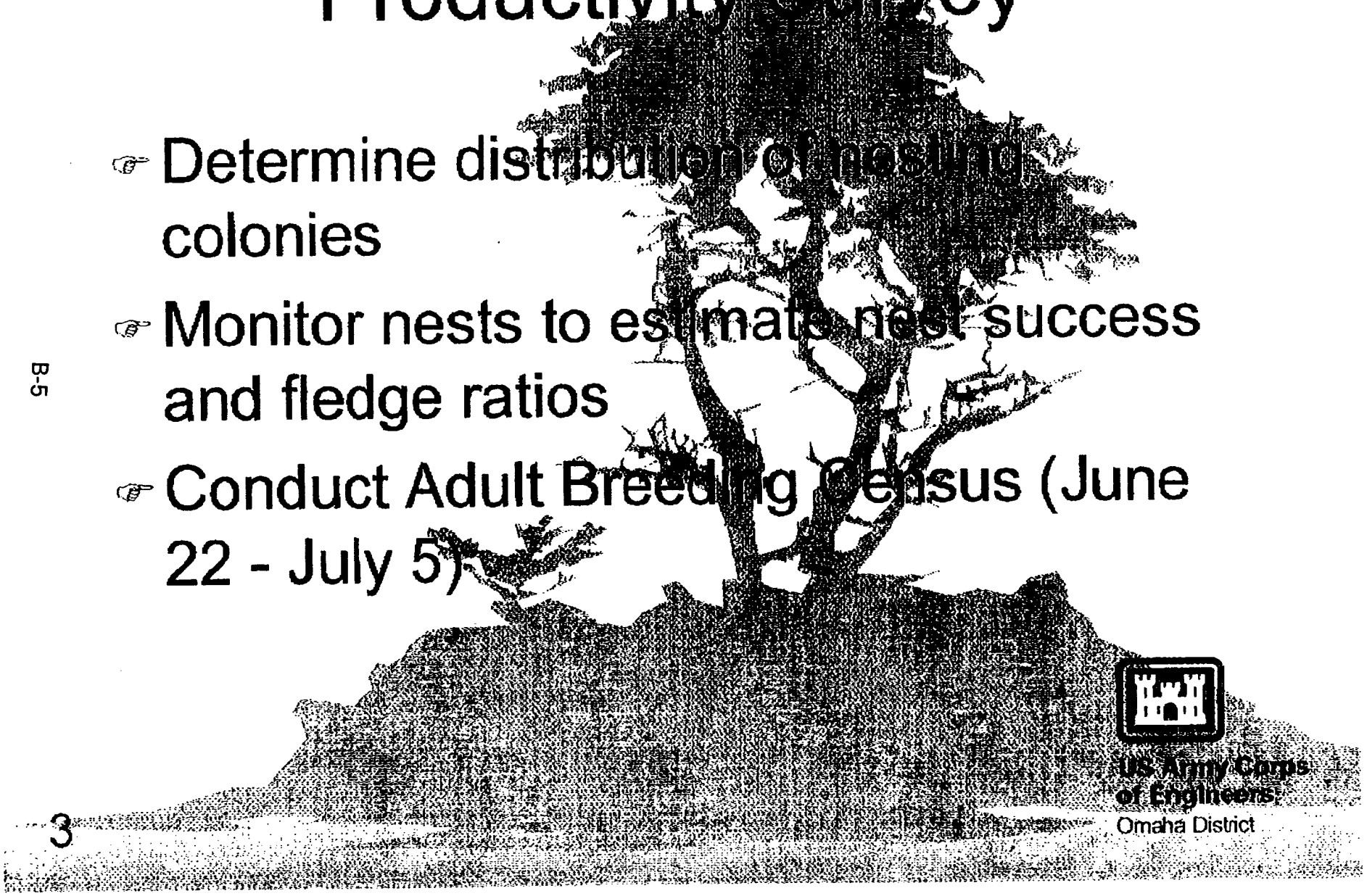
- Productivity Survey
- Habitat Development
- Increasing Recruitment
- Captive Rearing
- Special Studies



US Army Corps of Engineers
Omaha District

Productivity Survey

- Determine distribution of nesting colonies
- Monitor nests to estimate nest success and fledge ratios
- Conduct Adult Breeding Census (June 22 - July 5)



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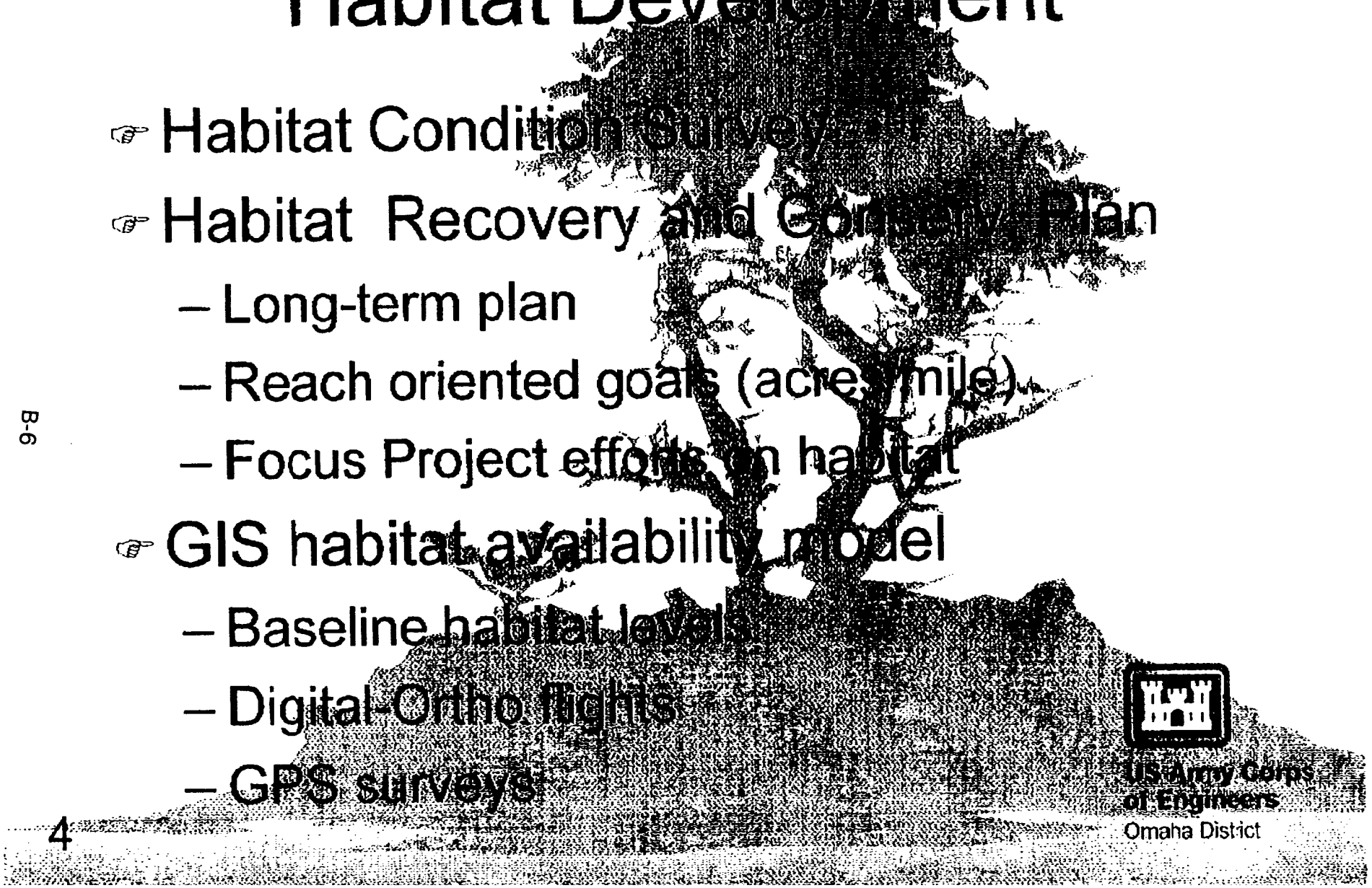
US Army Corps of Engineers
Omaha District

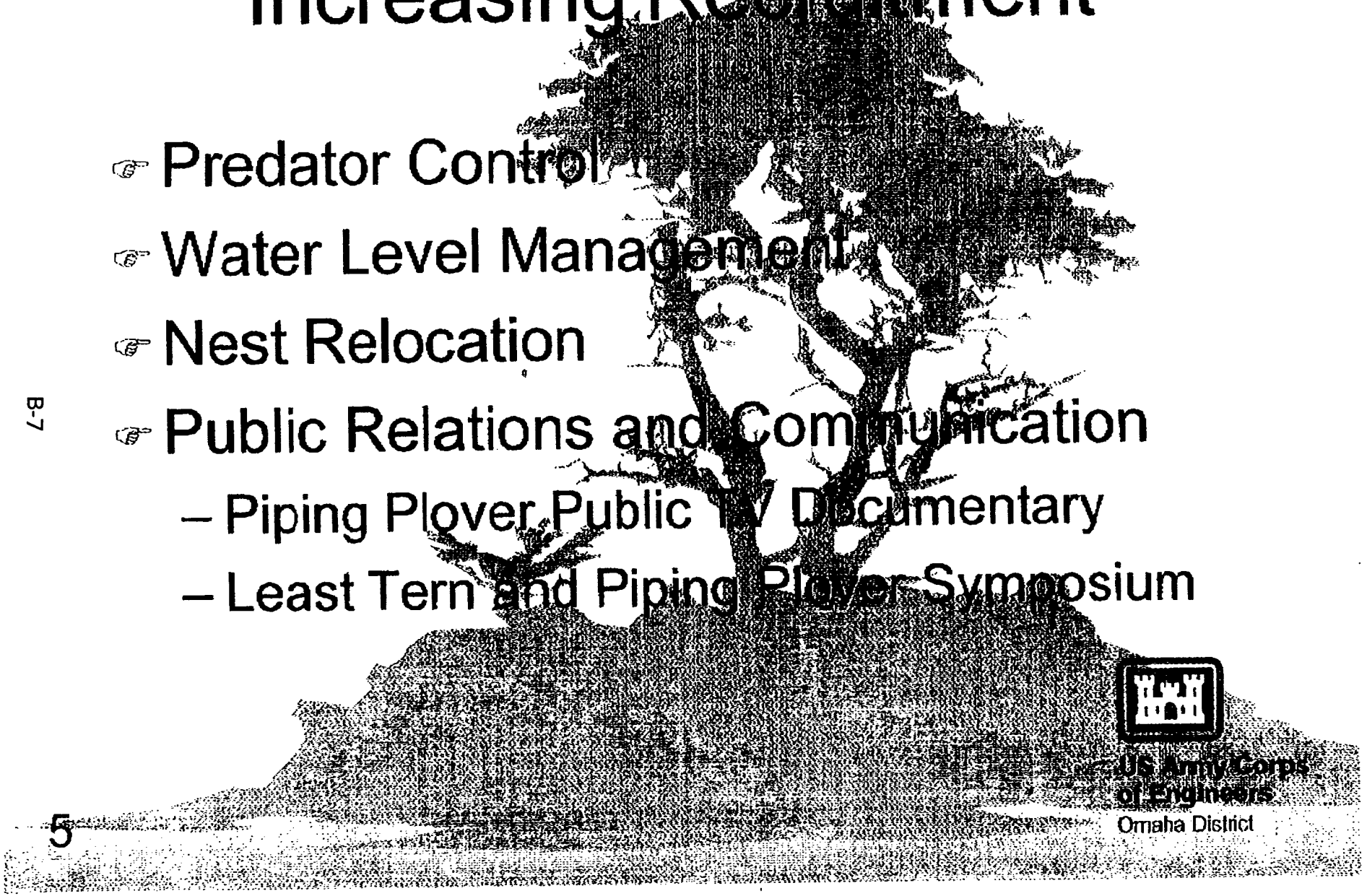
Habitat Development



- Habitat Condition Survey
- Habitat Recovery and Conservation Plan
  - Long-term plan
  - Reach oriented goals (acres/mile)
  - Focus Project efforts on habitat
- GIS habitat availability model
  - Baseline habitat levels
  - Digital-Ortho flights
  - GPS surveys

US Army Corps of Engineers
Omaha District

Increasing Recruitment



- Predator Control
- Water Level Management
- Nest Relocation
- Public Relations and Communication
  - Piping Plover Public TV Documentary
  - Least Tern and Piping Plover Symposium

US Army Corps of Engineers
Omaha District

Captive Rearing

- Develop pictorial of age classes based on plumage characteristics
- Piping plover food habit study
- Refine tern flight conditioning protocol
- Evaluate banding techniques to reduce band related injuries/mortality
- Refine age/weight charts

U.S. Army Corps of Engineers
Omaha District

Special Studies

- Yellowstone River Study--completed
  - Montana State University
- Niobrara River Study--second year of two year study
  - South Dakota State University
- Fledge Survival Study--Preliminary year
  - University of Wisconsin

US Army Corps of Engineers
Omaha District

Issues for 1997 Workplan

- High Water
  - No substantive habitat
    - Shift to marginal habitat (nesting tern)
  - Water storage/evacuation
    - Defining service level
    - Incidental take
      - Requirements for egg/feeding collection
    - Obtaining state permit
- Biological Opinion/Annual Permit
  - Clarification of Roles

US Army Corps of Engineers
Omaha District

SUMMARY OF THREATENED AND ENDANGERED SPECIES ACTIVITIES IN THE OMAHA DISTRICT FOR 1997

Initial habitat conditions for least terns and piping plovers on the Missouri River Basin were not favorable for the two species. Heavy snow accumulation on the northern Great Plains and Northern Rockies portended high lake levels and high releases from the dams on the Missouri River (Mo.R.). This came to pass as the Lakes at Fort Peck, Sakakawea, Oahe, and Francis Case rose into their exclusive flood zones. These record high Lake levels required much higher than normal releases from the mainstem dams. This combination resulted in the inundation of large areas of habitat on the lakes and the river below the dams.

The adult census of piping plovers reflected this loss of habitat. Only 117 adult plovers were found in 1997. This represents a 36% decline (117/182) in plover numbers compared to 1996 and an 82% decline (117/618) in plover numbers compared to the peak year of 1991. Overall the census count of 117 adult plovers was the lowest ever in the eleven years censuses have been conducted on the Mo. R. The adult census for least terns found 481 birds. This represents an 8% (481/444) increase compared to 1996. Tern numbers however, were down 38% (481/772) compared to the peak year of 1994.

Productivity throughout the Mo. R. system rebounded for least terns and piping plovers in 1997 compared to 1996. The fledge ratio for least terns was .66 fledglings per adult pair in 1997 compared to the abysmal .16 recorded for 1996. The .66 fledge ratio was the third highest in the eleven years the fledge ratio has been measured on the Mo. R. Productivity for piping plovers on the Mo. R. increased to .87 fledglings per adult pair in 1997 compared to .41 in 1996. The fledge ratio was the highest since 1993. This is encouraging but must be tempered by two factors; the low number of plovers recorded during the adult census and the concentration of fledglings at a limited number of locations.

Though not nearly on the scale of 1995 or 1996, salvage collection of least tern and piping plover eggs threatened by flooding was conducted in 1997. Eggs were collected from two areas, Lake Sakakawea and below Garrison Dam. In both areas it was determined that the eggs that were collected would not have survived the rise of Lake Sakakawea or the increased releases from Garrison Dam. The rescued eggs were transported to the Gavins Point Project for incubation and captive rearing. Of the 33 plover eggs that were collected, 26 chicks hatched and fledged (2 later died). The remaining 24 plover juveniles were released into the wild, 16 in Montana and 8 at the mouth of the Niobrara River. Of the 26 tern eggs that were collected, 19 chicks hatched and 16 lived to fledge. All 16 of the juvenile terns were released at the mouth of the Niobrara.

During the nesting season several management activities were undertaken to benefit the terns and plovers including: cages on plover nests to protect the nest from predators; nest sites close to or within recreation areas or areas with the high potential for human disturbance were posted with signs restricting access; and signs informing the public of the presence of endangered species and prohibiting their entry were put up.

The record high lake levels and releases of 1997 caused a great deal of natural scouring of river sandbars and lake shoreline beaches. As a result the only habitat management activities that took place was some vegetation removal on several islands on the Mo. R. below the confluence with the Yellowstone River.

In 1997 the second year of the Niobrara River Study was completed. This study, conducted by South Dakota State University, is being done to determine if least tern and piping plover nest site selection and reproductive success are related to habitat composition and availability on a natural river system.

Finally the Corps of Engineers, Omaha District, along with the U.S. Fish and Wildlife Service and the University of Wisconsin is funding a project to study survivability of captive reared piping plovers compared to wild reared, or naturally reared, plovers. Preliminary work on this project was begun in 1997.

APPENDIX C

COORDINATION AND PERMIT ACTIVITY

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
215 NORTH 17TH STREET
OMAHA, NEBRASKA 68102-4978

REPLY TO
ATTENTION OF
Natural Resource Management Section
Operations Division

Mr. Donald R. (Pete) Gober
Field Supervisor - Ecological Services
U.S. Fish and Wildlife Service
420 South Garfield Avenue, Suite 400
Pierre, South Dakota 57501-5408

Dear Mr. Gober:

Please find enclosed the Omaha District, U.S. Army Corps of Engineers' (Corps) 1997 Least Tern and Piping Plover Management Plan for the Missouri River. This management plan outlines the mission that will be undertaken in 1997 by the Corps of those contracted by them to meet the recovery objectives of these species. This management plan incorporates recommendations from state wildlife agencies, the U.S. Fish and Wildlife Service, various zoos, and recent research findings. The Corps requests renewal of subpermit 93-07 to carry out the activities listed in the management plan. We anticipate submitting the 1996 permit activity report to you by December 31, 1996.

We request that the principal permittee on the new subpermit be changed from Colonel Michael S. Meuleners, Omaha District Commander, to Colonel Robert D. Volz, Omaha District, U.S. Army Corps of Engineers, 215 North 17th Street, Omaha Nebraska 68102-4978. Other changes specific to permit conditions contained within the 1997 management plan include:

1. Egg floatation techniques to determine stage of incubation; page 5, paragraph 1.

2. Collecting eggs threatened by natural events; page 5, paragraph 4.

3. Criteria for entering storage evacuation service level and subsequent collection of eggs; page 6, paragraph 4.

Thank you for your attention to this matter.

Sincerely,

Robert D. Volz
Colonel, Corps of Engineers
District Engineer

Enclosure

LEAST TERN AND PIPING PLOVER MANAGEMENT PLAN
OMAHA DISTRICT - CORPS OF ENGINEERS

1997 MISSOURI RIVER OPERATIONS

The US Army Corps of Engineers (Corps) received a jeopardy Biological Opinion on the operations of the Missouri River Main-stem System from the US Fish and Wildlife Service (USFWS) on November 14, 1990. This Biological Opinion (Opinion) concluded that if the operations of the Missouri River remained unchanged, the continued existence of the interior population of the least tern (*Sterna antillarum*) and the Great Plains population of the piping plover (*Charadrius melodus*) would likely be jeopardized. The least tern was listed as federally endangered in 1985. The piping plover was listed as federally threatened in 1985.

The Opinion included Reasonable and Prudent Measures, Reasonable and Prudent Alternatives, and Conservation Measures, that, if implemented, would preclude jeopardy to these species. Success of implementing the alternatives and subsequent preclusion of jeopardy, is measured by the recruitment of flighted least tern and piping plover chicks on the Missouri River. This management plan outlines the mission that will be undertaken in 1997 by the Corps or those contracted by such, to implement these recovery measures.

MANAGEMENT SITES

1. Fort Peck Reservoir - River Miles 1785.0-1771.0

2. Missouri River below Fort Peck Dam - River Miles 1770.9-1568.1

3. Lake Sakakawea Reservoir - River Miles 1568.0-1389.6

4. Missouri River below Garrison Dam - River Miles 1389.2-1299.1

5. Lake Oahe Reservoir - River Miles 1299.0-1072.0

6. Missouri River below Fort Randall Dam - River Miles 880.0-845.0

7. Lewis and Clark Reservoir - River Miles 845.0-811.0

8. Missouri River below Gavins Point Dam - River Miles 811.0-750.0

Total of 1,035 river miles

WATER LEVEL MANAGEMENT

Following operational projections are based on 1 August 1996 runoff forecasts. Runoff is forcasted for Median (expected), Upper and Lower Quartile (1 in 4), and Upper and Lower Decile (1 in 10) inflows. Reference the 1996-97 Missouri River Main Stem Reservoirs - Annual Operating Plan for further details.

Fort Peck - Releases will be in the 5,000 to 9,000 cfs range in April 1997 and increased to a 9,000 to 13,500 cfs average in May. The median, lower quartile, and lower decile plans show daily releases will be in the 10,500 to 11,000 cfs range from June through August. The upper quartile plan has the June through August release rate at 12,000 cfs to 13,500 cfs. Should greater than upper decile inflows appear likely, project releases may be increased above those flows shown in June or July as the need to evacuate floodwater will be imperative.

Hourly peaking restrictions of no more than 6 hours of 14,000 cfs will be in place during the nesting season unless inflows are greater than the upper quartile. If flood flows enter the Missouri River below the project during nesting, hourly releases will be lowered to no less than 3,000 cfs in order to keep traditional riverine fish rearing areas continuously inundated while helping to lower river stages at downstream nesting sites.

Garrison - Daily average releases will be increased in May 1997 to prevent birds from nesting on low sandbars below the project. The increase will be to 32,000 cfs with the upper quartile plan and 26,000 to 23,000 cfs with plans showing median to lower decile runoff. Should upper decile or greater inflows appear likely, project releases will be at high levels in June as evacuation of flood waters will be necessary. In an effort to provide as much habitat for nesting and brood rearing as possible, upper quartile thru lower decile daily average releases from June thru August will be reduced between 1,000 to 2,000 cfs. As in past years, hourly peaking will be limited to no more than 30,000 cfs for 6 hours if the daily average release is lower than 29,000 cfs. This will limit peak stages below the project for nesting birds.

Lake Sakakawea spring pool elevations will be dependent upon the pattern of inflow. Current projections show the potential for a constant to rising pool from April through July with a lower quartile inflow scenerio but declining pool levels with a lower decile runoff. Only very large spring inflows and/or low releases will inundate all of the plover and tern habitat on the reservoir.

Fort Randall - Releases from Fort Randall will mirror those from Gavins Point Dam. Hourly releases will be limited to 37,000 cfs, while daily average flows may be increased every third day to preserve the capability of sustaining this third day release later in the summer, if conditions turn dry.

Gavins Point - For median, lower quartile, and lower decile runoff scenarios there will be an increase in releases by early May when the birds show up, to the level needed to support navigation in August. Cycling releases every third day is not planned during the 1997 nesting season. Releases during mid May through August for the median and lower quartile are expected

to average 34,000 cfs. Lower decile flows for this time period will be near 33,000 cfs. For the upper quartile, releases may range up to 49,500 cfs. For the upper decile, releases may range up to 55,000 cfs. However, release reductions may occur due to downstream flood runoffs. Spilling will be required beginning in summmer through fall under upper quartile and upper decile inflow.

Gavins Point pool will be operated near 1206.0 ftmsl in the spring and early summer. Slight variations will occur day to day due to rainfall runoff. The pool will be increased to elevation 1207.0 ftmsl following the nesting season.

Assuming the reservoir system storage starts near 57.5 MAF on March 1, 1997, the 1996-1997 forecasted upper quartile and upper decile inflows would provide system storage increases that would require evacuation of stored water from the system during the nesting season. The upper quartile plan reflects mitigating operational adjustments that can be implemented to provide secure nesting habitat through August 14. However, if an upper decile year occurs, the Corps will work closely with the Service and States to ensure the best possible outcome for the birds without jeopardizing our flood control responsibilities *(see Appendix A)*. If evacuation of stored flood water endangers the nesting effort on the river, the Corps proposes to collect, captive rear, and release (for research purposes), salvaged eggs and chicks, as was done in 1995 and in 1996 *(see Appendix B)*.

HABITAT MANAGEMENT

Habitat conditions throughout the basin are expected to be much improved for the 1997 nesting season. This following two years of well above normal system discharges and near record reservoir pool levels. In addition to reduced release forecasts, habitat within the reservoirs should be in excellent condition. With median runoff, Fort Peck Reservoir is expected to crest with a pool elevation of 2240.5 feet above mean sea level (ftmsl), down from a peak of 2247.3 ftmsl during July 1996; likewise, Lake Sakakawea Reservoir should peak at 1844.7 ftmsl in late July vs. 1849.5 ftmsl last year, and Lake Oahe Reservoir will peak nearly 9 feet less than 1996 at 1609.8 ftmsl.

With median through lower decile runoff, habitat management activities will center on documenting the effect of the high discharges during the past two years. Visual surveys will be conducted in late April and May on the lotic reaches to determine the effects of the high releases on habitat availability. A digital ortho photography flight is planned for the Garrison river reach to assist in developing a geographical information system (GIS) base map of the reach. This will allow for digital monitoring of seasonal changes in habitat availability and will begin to develop a database to evaluate long-term habitat trends. The flight will be geo-referenced to the monument network assembled on the Garrison river reach during the fall of 1996. This network is equivalent to the network set up on the Gavins Point river reach during 1994. If resources are available, a second digital ortho photography flight will be undertaken on the Gavins Point river reach. Additional habitat data including colony sites and nest locations, will be mapped using GPS for inclusion in the GIS database.

The Corps anticipates the need to start an aggressive habitat management plan during the fall of 1997. This will be essential to preserve the quality habitat created the past two years, and extend its availability into future nesting seasons. Maintenance and enhancement projects during the nesting season will be addressed on an individual project basis. Habitat development plans to enhance peninsula habitat above the high water mark on Lake Oahe and Lake Sakakawea, are continuing. A proposal is being prepared to develop habitat in partnership with the USFWS-Audubon National Wildlife Refuge on Lake Audubon.

BREEDING BIRD CENSUS

Fort Peck Reservoir, Lake Sakakawea, Lake Oahe, Lewis & Clark Lake and the Missouri River reaches below Fort Peck, Garrison, Fort Randall, and Gavins Point Dams will be surveyed to determine the total number of adult least terns and piping plovers within these areas. Census activities will be conducted with the aid of a boat and binoculars or spotting scope. Adults will be counted either while incubating clutches, loafing on the sandbar, or flying overhead near the natal areas. If heavy vegetation exists on an area, preventing observation of adults on the ground, birds will be flushed and counted while in the air. On sites with large nesting colonies, where bird activity makes accurate counts improbable, the census count will be recorded as twice the number of active nests plus brooding pairs. Date, time, observers, and site location will be recorded on Corps standardized census record cards. All terns and plovers observed on the reaches having adult plumage will be recorded as breeding adults. The adult census will be conducted during the last week of June through the first of July 1997.

PRODUCTIVITY MONITORING

Productivity monitoring of least terns and piping plovers will be conducted on Fort Peck Reservoir, Lake Sakakawea, Lake Oahe, Lewis & Clark Lake, on the Missouri River from Garrison Dam to the headwaters of Lake Oahe, on the Missouri River from Fort Randall Dam to the headwaters of Lewis & Clark Lake, and the Missouri River from Gavins Point Dam to Ponca, Nebraska. A subsample of the Missouri River below Fort Peck Dam, river miles 1714.0 to 1673.0 and 1581.4 to 1568.1, will also be monitored.

Initial surveys will include a determination of the distribution of nesting least terns and piping plovers within each reach. This survey will be conducted by boat on all suitable habitats between May 15 and June 15. Locations of courting or nesting pairs will be recorded on maps and inputted into the Corps' GIS. Earliest arrival dates in the spring and last observation dates in the fall will be recorded by species, for each reach.

Productivity monitoring of active colony sites will be accomplished on a seven to ten day visitation cycle. Sites will be accessed by boat with nest searching and monitoring being conducted on foot. In an effort to preserve embryo viability, surveys will be completed when ambient air temperature is below 90 degrees and nest site disturbance will be limited to 30 minutes or less. Nest locations will be marked with a wooden tongue depressor 2 meters from the nest. Nest data to be collected and recorded on Corps standardized nest cards includes species, habitat type, nest location, nest initiation date, clutch size, number of eggs hatched,

determination of causative factor or factors for nest termination, and nest hatching date. Egg floatation to determine stage of incubation will only be used in cases where nests are located with complete clutches. Excessive handling of early term embryos has been observed, in a captive situation, to result in embryo death.

Chick survival data collected will include a determination of the number of chicks fledged, date of fledging when possible, and a determination of the principle causative factor for chick mortality. Addled eggs and dead least tern and piping plover adults and chicks will be collected and turned over to designated authorities.

Deterrent measures will be implemented on sites where predation is limiting or has historically limited nest success. These measures will include exclosure cages on piping plover nests and strobe light systems on least tern colonies. Other forms of predator deterrence or experimental removal (in coordination with the USDA Animal Control Office) could be implemented following approval by respective State and USFWS offices. Colony sites determined to have a potential for recreational disturbance will be posted with informative restricted access signs and nesting areas will be roped off limits.

Protection of least tern or piping plover nests or chicks threatened by unforeseen natural events, including but not limited to: sandbar erosion, abandonment, excessive water levels and/or instability of selected nesting sites, will be evaluated according to a pre-approved contingency plan *(see Appendix A)*. Any eggs or chicks determined to be salvageable will be collected, reared and released according to the captive rearing protocal *(see Appendix B)*.

Outreach activities will be conducted to increase public awareness and knowledge about least terns and piping plovers and the role they play within the Missouri River ecosystem. These activities could include, but are not limited to, press releases, public service announcements, interviews and tours with local media, interpretive programs, participation in "awareness" days in local areas, and daily public relations. Any disruptive interpretive activity occurring on a colony site will be done concurrently with the 7 to 10 day monitoring cycle.

Weekly status reports will be composed during the nesting season. These reports will be divided by reach and will include by site the number of active nests of each species, number of chicks present of each species, adult census (during weeks of the census), total number of fledged chicks of each species, and any other pertinent data such as status of nests in relation to water elevation, etc. These reports will be forwarded on the following Monday to respective federal and state agencies. Reports will be discontinued when all activity is terminated in each respective reach.

A final report of permitted activities regarding least terns and piping plovers will be submitted to the Field Supervisor, Ecological Services, 420 South Garfield Avenue, Suite 400, Pierre, South Dakota 57501-5408, no later than December 31, 1996.

SPECIAL STUDIES

1. Niobrara River - This will be the second year of a two year study investigating the nesting ecology and habitat requirements of the interior least tern and piping plover on a plains runoff fed river ecosystem. The study area is the Niobrara River from it's confluence with the Missouri River continuing approximately one hundred miles up river. Efforts are to duplicate the work previously conducted on the Yellowstone river to assist in evaluating least tern and piping plover nesting ecology and habitat preferences on rivers with near natural hydrocycles. This information will assist the Corps in future management plan development.

2. Captive Rearing - It is believed that captive rearing, using eggs and chicks salvaged from flood conditions on the Missouri River, offers the potential to evaluate a wide variety of least tern and piping plover research and management questions. Therefore, the Corps will continue to pursue, with other interested parties, the opportunites provided by a captive rearing program. Any proposed project will be coordinated with the Service and State in which the project will occur so that appropriate permits can be obtained.

During 1997, eggs or chicks determined to be in imminent danger of being inundated during flood storage evacuation service* (flood control operations), will be collected (anticipated in 1997 only if upper decile or greater runoff). All efforts will be made to retain viability of natural nesting sites *(see appendix A)*. Field crews will monitor nest site elevations. Nests predicted, through UNET modeling, to be inundated by a scheduled flood control operation release will be collected, along with nests predicted to be flooded by rising reservoir pool elevations. Attending adults will be allowed to incubate the eggs until just prior to the inundating flow. This will ensure that birds will not attempt to renest on the jeopardized habitat prior to it being covered. Egg collections, incubation, rearing and release will be conducted according to approved protocals *(see appendix B)*. The Corps continues to seek advice from appropriate outside interests concerning the captive rearing facility and husbandry of the birds.

* Critera for scheduling of storage evacuation service level (flood control operations) *(see plate 44 in the Master Water Control Manual)*. The Corps of Engineers maintains and operates six Missouri River main stem dams for multi-purpose use. The flood control function of the system is a priority consideration while scheduling releases. Other multi-purpose regulation must be consistent with the flood control objectives. There will be times when the service provided to other purposes must be modified in the interest of flood control.

Gavins Point Project located near Yankton, South Dakota is the final project on the river and serves as a regulation reservoir. Releases from Gavins Point are termed "service levels" and are determined based on detailed runoff projections. Basic to utilization of the "service-level" concept is a definition of the minimum and maximum service levels that can be maintained while sustaining the design functions of the system. The minimum open water level which will sustain the navigation function throughout the Missouri River navigation project is a 29,000 cfs service level. Reductions below the minimum service level on the basis of potential flood control enhancement which may (or may not) occur, will not be made unless it appears evident that such reductions would have only a minor adverse effect upon other system functions. The full-service

level of downstream open-water flows is at 35,000 cfs. The initial increase above this full-service level has been designated as the expanded full-service level and consists of extending the navigation season 10 days. Additionally, as a storage evacuation measure, winter releases averaging 20,000 cfs can be scheduled from Gavins Point.

Full service winter level corresponds to a 15,000 cfs average winter release from Fort Randall. Experience has indicated as mentioned above, that the winter release level can be increased to a 20,000 cfs release rate from Gavins Point with only a modest increase in the potential for downstream ice-jamming. During these winter months, multi-purpose releases are restricted due to the possibility of ice formation and consequent severe loss in channel capacity. Since the ability to evacuate system storage is severely restricted during this time, the necessary increase in system release rates for flood storage evacuation purposes (system storage no higher than 57.2 MAF on March 1st) above rates necessary to meet other multi-purposes, will largely be made during the open water season.

Selection of appropriate service levels for flood storage evacuation purposes, in excess of the full-service levels, are dependent upon: (1) anticipated runoff from the drainage area above the main stem system; (2) depletions to this runoff that can be expected to occur prior to the time this runoff appears as inflows to the main stem reservoirs; (3) current total storage in the main stem system and in major tributary reservoirs above the main stem system; (4) and evaporation from the main stem reservoirs.

Plate 44 in the current Master Manual has been developed for definition of the service level at any time throughout the year. The "water supply" to be used for service level definition is a combination of (a) forecast runoff above Gavins Point Dam from the current date through December; (b) current system storage; and (c) tributary reservoir storage deficiency. The tributary reservoir storage deficiency at any given time is subtracted from the concurrent storage total in the six-reservoir main stem system and the resulting storage is then added to the forecasted remaining calendar year runoff to obtain the current water supply value which, in turn, is used to enter Plate 44 to determine the appropriate service level on which system releases should be based. One further adjustment to "water supply" needs to be made and it is (d) main stem storage reduction which is based on the fact that the total storage capacity of the main stem system has been reduced by about 2 million acre-feet due to sedimentation since plate 44 was originally conceived. Additionally, as a conservative measure prior to 1 July, a selected service level greater than full-service level should be 5,000 cfs less than indicated by use of plate 44.

Essentially, Plate 44 consists of storage (water supply) curves that can be expected to occur if the indicated service level is sustained through the remainder of the open water season and comparable releases are also maintained through the winter to the succeeding March 1st.

[Referenced Appendices A and B relating to chick rearing can be found in Appendix G]

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Mountain-Prairie Region

IN REPLY REFER TO:
ES/TE/Permit
Subpermit 93-07
Mail Stop 60120

MAILING ADDRESS:
Post Office Box 25486
Denver Federal Center
Denver, Colorado 80225-0486

STREET LOCATION:
134 Union Blvd.
Lakewood, Colorado 80228-1807

FEB 2 5 1997

Colonel Robert D. Volz
Omaha District Commander
U.S. Army Corps of Engineers
215 North 17th Street
Omaha, Nebraska 68102-4978

Dear Colonel Volz:

This letter authorizes you and designated members of your staff, as subpermittees (subpermit 93-07) under authority of permit PRT-704930, to conduct the following activities through December 15, 1997, for the purpose of scientific research under the following conditions.

Survey for piping plovers (Charadrius melodus) and interior least terns (Sterna antillarum athalassos) in nesting areas along the Missouri River and its tributaries and elsewhere in South Dakota, Montana, North Dakota, and Nebraska to determine habitat use, nesting success, and productivity.

1. Surveys for piping plovers and interior least terns will be conducted when the ambient temperature is below 90 degrees Fahrenheit.

   a. Surveys of each colony will be completed within 20 minutes.

   b. You may conduct up to three surveys to determine when the first territorial or breeding piping plovers or interior least terns have occupied a breeding territory. When the first territorial birds are found on a colony, the condition of 2.b. will take effect.

   c. Piping plovers and interior least terns will be observed from a distance of 200 feet or greater during nesting and brood rearing.

   d. Nesting piping plovers and interior least terns and those observed returning to their nests are not to be disturbed.

      However, when unforeseen events cause rising or excessive water levels or dangerously eroding sandbars that threaten piping plover and interior least tern nests, eggs, or chicks, after you have evaluated the situation and have received concurrence from the Fish and Wildlife Service's Field Supervisor, Ecological Services, 420 South Garfield Avenue, Suite 400, Pierre, South Dakota 57501-5408, telephone (605) 224-8693, you are authorized to relocate piping plover and interior least tern nests, eggs, and chicks as provided below.

(1) Move nests to higher ground that will not be inundated until after the eggs' anticipated hatching date.

(2) You may elevate nests above the anticipated high water mark using a tire, section of culvert, or other container filled with soil and/or rock. Material used should be of a similar texture to that of the nest scrape.

(3) Relocate nestlings or flightless chicks from nests surrounded by water or those on raised structures to suitable nearby habitat.

(4) You may manipulate nests, eggs, and chicks using other proven or reasonable techniques approved by the Field Supervisor (see address above).

(5) The techniques and procedures used when moving nests, eggs, or nestlings; the circumstance that required moving them; captive rearing and release into the wild; the monitoring efforts used to determine the effectiveness of these actions; and the results of the monitoring must follow the enclosed "Least Tern and Piping Plover Management Plan, Omaha District, Corps of Engineers, 1997 Missouri River Operations" and must be documented and included in the annual reports of activities conducted under this subpermit.

(6) In addition to following the Plan referenced above, you will develop and conduct a Release Monitoring Program (RMP) for captive reared birds that are released into the wild. The objective of this effort should be to determine the survivorship of birds treated in this manner after they have been released. The RMP should evaluate the value of the Corps of Engineers' salvage/captive rearing and release operation as a possible technique for the conservation of interior least terns and piping plovers. You must submit a proposal for the RMP to the Field Supervisor (see address above) by May 15, 1997, for approval prior to any salvage efforts conducted under this subpermit.

The provisions of the RMP, when approved by the Field Supervisor (see address above), will amend allowable activities under the Plan for the purposes of this subpermit.

Any variance from the RMP or the Plan must receive prior concurrence from the Field Supervisor (see the address above).

e. Surveys may be conducted using motor vehicles, canoes, motor boats, or on foot. Searchers will remain at a distance of 30 feet or more from nests and will not handle eggs or chicks, except where otherwise noted in this subpermit.

f. Nest sites may be signed or fenced as needed to protect them from livestock and recreational vehicles.

2. Conduct surveys for broods and nesting success.

   a. Nests may be checked for success or failure at 5- to 7-day intervals.

   b. No more than eight visits to determine reproductive success will be made to any colony during a breeding season.

   c. Collect addled eggs or eggshells from interior least tern and piping plover nests for research or analysis by the Service or a laboratory approved by the Field Supervisor. All eggs should be placed in a plastic bag with a label including date and location and should be stored in the freezer until they can be shipped unless notified otherwise by the Field Supervisor. Eggs from differing clutches should be clearly distinguished. Information about the number of eggs, their fertility, predators, etc., should be provided in your annual reports of activities.

      Piping plover egg samples can be sent directly to Dr. Susan Haig, U.S. Geological Survey, Biological Resources Division, Forest and Rangeland Ecosystem Science Center, Oregon State University, 3200 S.W. Jefferson Way, Corvallis, Oregon 97331. Dr. Haig should be contacted at (503) 750-7482, and arrangements should be made before shipping.

   d. Collect any dead piping plovers or interior least terns found during surveys for autopsy or research analysis. Contact the Field Supervisor (see address above) for specific instructions on disposition of birds. Information about the cause of death, if known, predators, etc., should be provided in your annual reports of activities.

   e. Eggs and dead birds collected pursuant to condition 2.c. and 2.d. must be delivered to the nearest Service Ecological Services Office. Please call the Field Supervisor (see number above) for the location of the nearest office and/or if you have any questions about how to store or ship the eggs or birds.

3. You may mark nests using inconspicuous dull wooden stakes, i.e., tongue depressors, wooden dowels, or small branches from brush or trees. Markers will be placed at least 30 feet from any nest.

4. When first found or if nests are threatened, you may sign or fence nest sites to protect them from livestock and recreational vehicles. Nests also may be covered using 3- by 3-foot square, 2-foot 6-inch high woven wire exclosures having 2-inch diameter wire mesh to protect them from predators.

5. Build predator exclosures at piping plover and interior least tern nest sites.

6. Use flashing strobe lights mounted on fence posts or other structures to discourage predators.

Lights may be configured to light selected parts of nesting areas and should be timed to flash out of synchrony as described in the previously provided report "Strobe Lights Deter Predators."

7. Stage of incubation may be determined using egg floatation techniques described in:

Schwalbach, M.J. 1988. The Conservation of Least Tern and Piping Plover Along the Missouri River and Its Major Western Tributaries in South Dakota. MS Thesis. South Dakota State University; Brookings, SD.

However, this technique will only be used in cases where nests are found with complete clutches. In Montana, not more than one fertile egg per nest may be floated to estimate the stage of incubation.

8. Except in the state of Montana, you may number eggs as needed using a No. 2 pencil or nontoxic felt-tipped pen as mentioned in:

Mitchell, C.A. and T.W. Custer. 1986. Hatching Success of Caspian Terns Nesting on the Lower Laguna Madre, Texas, USA. Colonial Birds. 9(1). Pp 86-89.

Persons working with eggs and caging materials will reduce human scent by washing in scent canceling soaps before any activities on an active nest colony.

9. Piping plover and interior least tern chicks may be photographed but not handled, except as stipulated in condition 1.d.

   a. Pre-flight juveniles will not be disturbed if ambient temperature exceeds 90 degrees Fahrenheit.

   b. No pre-flight juveniles will be pursued within the borders of the nesting colony.

   c. Juveniles should not be pursued for photographing individuals.

10. Before release of piping plovers held in captivity pursuant to condition 1.d., attach a serially-numbered Service band and a "flag" or color band combination to the leg of each bird.

   a. Size 1A stainless steel serially-numbered Service bands will be used. Service bands will be applied to the upper leg.

   b. Apply a light blue flag or other color approved by the Field Supervisor on the lower leg opposite the Service band. Information concerning materials, preparation of flags, and method of application is enclosed.

   c. Only flags and color bands made of UV stable, Darvic tm plastic manufactured by A.C. Hughes should be used. Color banding combinations should be coordinated with the Migratory Bird Management

Office and the Field Supervisor to ensure that combinations are not in conflict with other piping plover projects.

d. Juvenile piping plovers 16 days and older may be color banded.

11. Before release of interior least terns held in captivity pursuant to condition 1.d., attach a size 1A stainless steel serially numbered Service band to the leg of each bird.

a. Color bands not to exceed two total may be used to distinguish individual interior least terns.

b. Interior least terns 12 days and older may be color banded.

c. Only color bands made of UV stable, Darvic tm plastic manufactured by A.C. Hughes should be used. Color banding combinations should be coordinated with the Migratory Bird Management Office and the Field Supervisor to ensure that combinations are not in conflict with other interior least tern projects.

Coverage under this subpermit is provisionary under the following restrictions.

1. You will obtain the required permits and conduct your activities in compliance with the Service's Bird Banding Laboratory and all the laws and regulations of the States of South Dakota, Montana, North Dakota, and Nebraska, and those Federal Agencies upon whose lands you work. This subpermit does not grant the right of trespass. Permission must be obtained from private landowners or the land management agency to enter and work on their land.

2. All activities will be coordinated with the Field Supervisor (see address above). You are to inform that office of all activities conducted under this subpermit.

3. In the event that a piping plover or interior least tern is accidentally injured, you must immediately cease activities and contact the Field Supervisor (see address above) to obtain information on the closest authorized animal rehabilitator. Once the situation has been remedied, the Service, after analysis of the circumstances surrounding the injury, may reauthorize or deny additional activities under this subpermit.

Any threatened or endangered species that is accidentally killed (taken) while conducting activities authorized by this subpermit must be reported within 24 hours to the Field Supervisor (see address above). Species and/or the parts of species that are taken remain the property of the Service. If the disposal of species is not identified in the above conditions, the Service's Assistant Regional Director, Law Enforcement, P.O. Box 25486, Denver, Colorado 80225, telephone (303) 236-7540, will make the final determination on disposition of any threatened or endangered species taken during authorized activities.

4. Collection of feathers, eggs, carcasses, and parts thereof are authorized under the Migratory Bird Treaty Act. Disposition of these items shall be at the instruction of the Field Supervisor (see address above), who will coordinate with Law Enforcement personnel in the Regional Office.

5. If you wish to continue work with endangered or threatened species after expiration of this subpermit, your request for subpermit renewal must be received by the Field Supervisor (see the address above) on or before November 15, 1997. Meeting this requirement allows you to continue authorized activities until your renewal application is acted upon. If this requirement is not met, the subpermit becomes invalid on the date of expiration. You may appeal any permit modification if you believe it is unacceptable. The Code of Federal Regulations, Title 50, Section 13.32, appeal procedure, is enclosed for your guidance. Any new activities or changes in activities with threatened or endangered species will require that your subpermit be amended. You are not authorized to conduct any new activities or to change any permitted activities until you have requested and have received a new or an amended subpermit.

6. Annual reports of all activities conducted under the authority of this subpermit must be submitted to the Field Supervisor (see address above) by December 31, 1997. Failure to submit annual reports will invalidate this subpermit. Your reports should include complete accounts of all activities conducted under this subpermit. A renewal request for 1998 will not be processed until the 1997 annual report is received.

7. A copy of permit PRT-704930 is enclosed; the conditions of this permit must be adhered to. This letter and the enclosed copy of permit PRT-704930 must be in your possession, or in the possession of designated members of your staff, while conducting all authorized activities.

Please reference subpermit 93-07 when submitting renewal or amendment requests and activity reports. If you have any questions about this authorization or need additional information, please contact the Field Supervisor (see address above).

Sincerely,

/s/JOHN CORNELY

ACTING Assistant Regional Director
Refuges and Wildlife, ND/SD

Enclosures

Nebraska Game and Parks Commission

2200 N. 33rd St. • P.O. Box 30370 • Lincoln, NE 68503-0370
Phone: 402-471-0641 • Fax: 402-471-5528 • http://www.ngpc.state.ne.us/

CASEY KRUSE
COE PO BOX 710
YANKTON SD 57078

Dear Mr Kruse:

Enclosed is your 1997 Nebraska scientific collecting permit. Since it constitutes a privileged exemption for taking protected wildlife, activities conducted under its authority must be closely monitored. To facilitate proper monitoring of permit activities the following guidelines apply:

1. The permit must be carried on your person when collecting, banding, etc.

2. All persons engaged in collecting or other permit activities must possess a permit. Sub-permits can be issued to assistants or associates. Students do not need a sub-permit but must always be accompanied by the teacher (permit holder).

3. You must advise the area Conservation Officer at least 24 hours prior to your intended collection or other authorized activities in his/her assigned area. This can be done directly to the officer or through the appropriate district office. A list of the offices and officers and their telephone numbers is enclosed.

4. You must report the collection or other activities accomplished under authority of the permit by February 1 following the expiration of the permit. A reporting form and application for permit renewal will be sent to you in December. Your permit will not automatically be renewed. You must submit a new application each year.

5. Failure to comply with the conditions of your permit, reporting requirements or permit guidelines will result in revocation of your permit and/or non-renewal of the permit as well as possible legal prosecution.

GENERAL RULES AND REGULATIONS

1. FEDERAL PERMIT REQUIRED FOR ANY MIGRATORY BIRDS, FEATHERS OR NESTS.

2. THIS PERMIT DOES NOT ALLOW TAKING OR POSSESSION OF ANY THREATENED OR ENDANGERED SPECIES UNLESS SO SPECIFIED.

3. NO GUN COLLECTION OF BIRDS OR MAMMALS EXCEPT DURING A LEGAL HUNTING SEASON UNLESS SO SPECIFIED

4. THIS PERMIT DOES NOT ALLOW THE COLLECTOR TO PURSUE ANY COLLECTIONS ON PRIVATE OR PUBLIC PROPERTY WITHOUT FIRST OBTAINING PERMISSION FROM THE LANDOWNER OR HIS/HER REPRESENTATIVE.

Scientific collecting permits authorize activities that are restricted and often highly visible to the general public. All such activities must be undertaken in a responsible and professional manner. Please do your part in assisting us with proper management of Nebraska's wildlife and maintaining a positive image of scientific and educational endeavors dealing with those resources.

Please feel free to call this office at any time if you have questions pertaining to your permit or the guidelines relating to it. My phone number is 402-471-5448. Our Fax number is 402-471-5528.

Sincerely

Norm Dey

Norm Dey
Administrative Assistant
Wildlife Division

DEPARTMENT OF GAME, FISH AND PARKS
Foss Building
523 East Capitol
Pierre, South Dakota 57501-3182

WILDLIFE RESTORATION
PROGRAM

June 2, 1997

Casey Kruse
U.S. Army Corps of Engineers
Lewis and Clark Lake Office
PO Box 710
Yankton, SD 57078

Dear Casey:

Authorization is hereby given to you or those acting at your direction, as per South Dakota Statute 34A-8-8 to perform the following activities:

1. Survey for piping plover (*Charadrius melodus*) and interior least terns (*Sterna antillarum*) in nesting areas along the Missouri River and its tributaries and elsewhere in South Dakota to determine habitat use, nesting success, and productivity. Conditions described in U.S. Fish and Wildlife Service Subpermit 93-07, dated February 25, 1997, including activities to relocate nests, eggs, and nestlings, should be followed to comply with this permit to handle state threatened and endangered species.

2. Conduct surveys for broods and nesting success. Conditions described in USFWS Subpermit 93-07, should be followed.

3. Nests may be marked using inconspicuous dull wooden stakes, i.e., tongue depressors, wooden dowels, or small branches from brush or trees. Markers will be placed at least 30 feet from any nest.

4. When first found, or if nests are threatened, nest sites may be signed or fenced to protect them from livestock and recreational vehicles. Nests also may be covered using 3- by 3-foot square, 2 ½ foot high woven wire enclosures having 2-inch diameter wire mesh to protect them from predators.

5. Erect predator exclosures at piping plover and least tern nest sites.

6. Use flashing strobe lights mounted on fence posts or other structures to discourage predators.

Office of Secretary: 605/773-3387 Wildlife Division: 605/773-3381 Parks and Recreation Division: 605/773-3391 FAX: 605/773-6245
TDD: 605/773-3485

7. Determine incubation stage using egg floatation techniques described in Schwalbach, M.J., 1988, The Conservation of Least Tern and Piping Plover along the Missouri River and its Major Western Tributaries in South Dakota, M.S. Thesis, SDSU, Brookings, SD.

8. Number eggs as needed using a No. 2 pencil or nontoxic felt-tipped pen.

9. Photograph chicks, following precautions listed in USFWS Subpermit 93-07.

10. Attach a flag and band to piping plovers held in captivity, following direction of USFWS Subpermit 93-07.

11. Attach a band to least terns held in captivity, following direction of USFWS Subpermit 93-07.

12. Collect eggs for captive rear salvage. Eggs will be collected only from nests in imminent danger of flooding.

13. Captively rear eggs under Captive Rearing Protocol developed by U.S. Army Corps of Engineers.

This permit expires on September 30, 1997.

John L. Cooper
Secretary

MONTANA FISH, WILDLIFE AND PARKS

SCIENTIFIC COLLECTOR'S PERMIT

Permit No. 1430 Date Issued June 2, 1997

Fee N/A Date Expires December 31, 1997

Permit issued to: Casey D. Kruse & Associates

Address: Corps of Engineers, PO Box 710, Yankton, SD 57078

Associated with: Corps of Engineers

Permission is given to Casey Kruse & Associates to take, kill, capture, or possess, in accordance with the provisions of Section 87-2-806, MCA, the following:

collect Least Tern and Piping Plover eggs in numbers needed from flood plains to be captive reared and released.

This permit is not transferable. Migratory birds may be taken only under authority of a federal permit in conjunction herewith.

Report: Upon expiration of this permit, a report shall be submitted to the Montana Fish, Wildlife and Parks director giving the total number and kind of specimens collected.

MONTANA FISH, WILDLIFE AND PARKS

BY: Robert R. Martinka
Chief of Field Operations

c: A. Dood

REPORT OF PROTECTED ANIMALS TAKEN FOR AUTHORIZED PURPOSES

Name of Collector _____

Collector's Permit No. _____ Year _____

Date	Species	No.	Locality (be specific)	Reason for Collecting	How Collected	Disposi

This report must be submitted to the Montana Department of Fish, Wildlife, & Parks by January 15 of the following year.

Signed _____ Address _____ Date _____

APPENDIX D

HABITAT WORK

CEMRO-OP-GA 04 April, 1997

MEMORANDUM FOR OP-R-ND

SUBJECT: Department of the Army Permit Application Audubon Piping Plover Islands Project

1. Enclosed is a permit application for habitat work on Lake Audubon to improve nesting for Piping Plovers.

2. The project will involve placing approximately 3,052 cubic yards of rock material as well as discharging approximately 22,232 cubic yards of material onto several existing islands within Audubon National Wildlife Refuge.

3. A dredge will be used to discharge the material. It is preferred that the rock material be placed during the winter months so equipment can move across the ice to the various islands.

4. The material to be dredged consists of silt and sand from the vicinity of the islands.

5. If you have any questions please feel free to contact Gary Ledbetter at 701-654-7411.

6. For your action.

Sincerely,

George H. Wolf
Project Manager

encls

cc: OP-GP (Kruse)

APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT *(33 CFR 325)*	OMB APPROVAL NO. 0710-003 Expires October 1996

Public reporting burden for this collection of information is estimated to average 5 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters Service Directorate of InformationOperations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302; and to the Office of Management and Budget, Paperwork Reduction Project (0710-0003), Washington, DC 20503. Please DO NO RETURN your form to either of those addresses. Completed applications must be submitted to the District Engineer having jurisdiction over the location of the proposed activity.

PRIVACY ACT STATEMENT

Authority: 33 USC 401, Section 10; 1413, Section 404. Principal Purpose: These laws require permits authorizing activities in, or affecting, navigable waters of the United States, the discharge of dredged or fill material into waters of the United States, and the transportation of dredged material for the purpose of dumping it into ocean waters. Routine Uses: Information provided on this form will be used in evaluating the application for a permit. Disclosure: Disclosure of requested information is voluntary. If information is not provided, however, the permit application cannot be processed nor can a permit be issued.

One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and instructions) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned.

(ITEMS 1 THRU 4 TO BE FILLED BY THE CORPS)

1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED	4. DATE APPLICATION COMPLETE

(ITEMS BELOW TO BE FILLED BY APPLICANT)

5. APPLICANT'S NAME	8. AUTHORIZED AGENT'S NAME AND TITLE *(an agent is not required)*
U.S. Army Corps of Engineers Garrison Project	
6. APPLICANT'S ADDRESS	**9. AGENT'S ADDRESS**
P.O. Box 527 Riverdale, ND 58565	
7. APPLICANT'S PHONE NOS. W/AREA CODE	**10. AGENT'S PHONE NOS. W/AREA CODE**
a. Residence —	a. Residence
b. Business 701-654-7411	b. Business

11. STATEMENT OF AUTHORIZATION

I hereby authorize, _____ to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application.

APPLICANT'S SIGNATURE DATE

NAME, LOCATION AND DESCRIPTION OF PROJECT OR ACTIVITY

12. PROJECT NAME OR TITLE *(see instructions)*

Audubon Piping Plover Islands Project

13. NAME OF WATERBODY, IF KNOWN *(if applicable)*	14. PROJECT STREET ADDRESS *(if applicable)*
Lake Audubon	
15. LOCATION OF PROJECT	
McLean (COUNTY) ND (STATE)	

16. OTHER LOCATION DESCRIPTIONS, IF KNOWN, *(see instructions)*

#1 R 82 W Tnsp 148 N Sec 33, #2 R 82 W Tnsp 148 N Sec 30, #3 R 82W, Tnsp 147 N Sec3

17. DIRECTIONS TO THE SITE

Summary of Piping Plover Habitat Project Lake Audubon

During the early spring from about May 1, 1997 until May 15, 1997 Piping Plovers arrive at Lake Audubon and frequent various islands with the Refuge. The operating plan for Lake Audubon causes the lake to rise to an elevation that covers the majority of the habitat available. Plovers will then leave the area for more suitable habitat. They have however been seen during the Adult Census which takes place during the later part of June.

The proposal is to do some beach replenishment on three islands as well as place rock material on areas that have an erosion problem. With the use of a dredge the islands will be built up to withstand the higher lake levels.

Approximately 22,232 cu.yds. of dredge material will be deposited on these islands to build up the beaches. An additional 3,052.1 cu. yds. of rock will be placed to control erosion.

(SEE ENCLOSURE #2 FOR DETAIL OF QUANITIES)

It is hoped with this method that the islands will be built up to an elevation of 1849 allowing more permanent habitat to be available.

PIPING PLOVER PROJECTS

MATERIAL QUANTITIES - MARCH 97

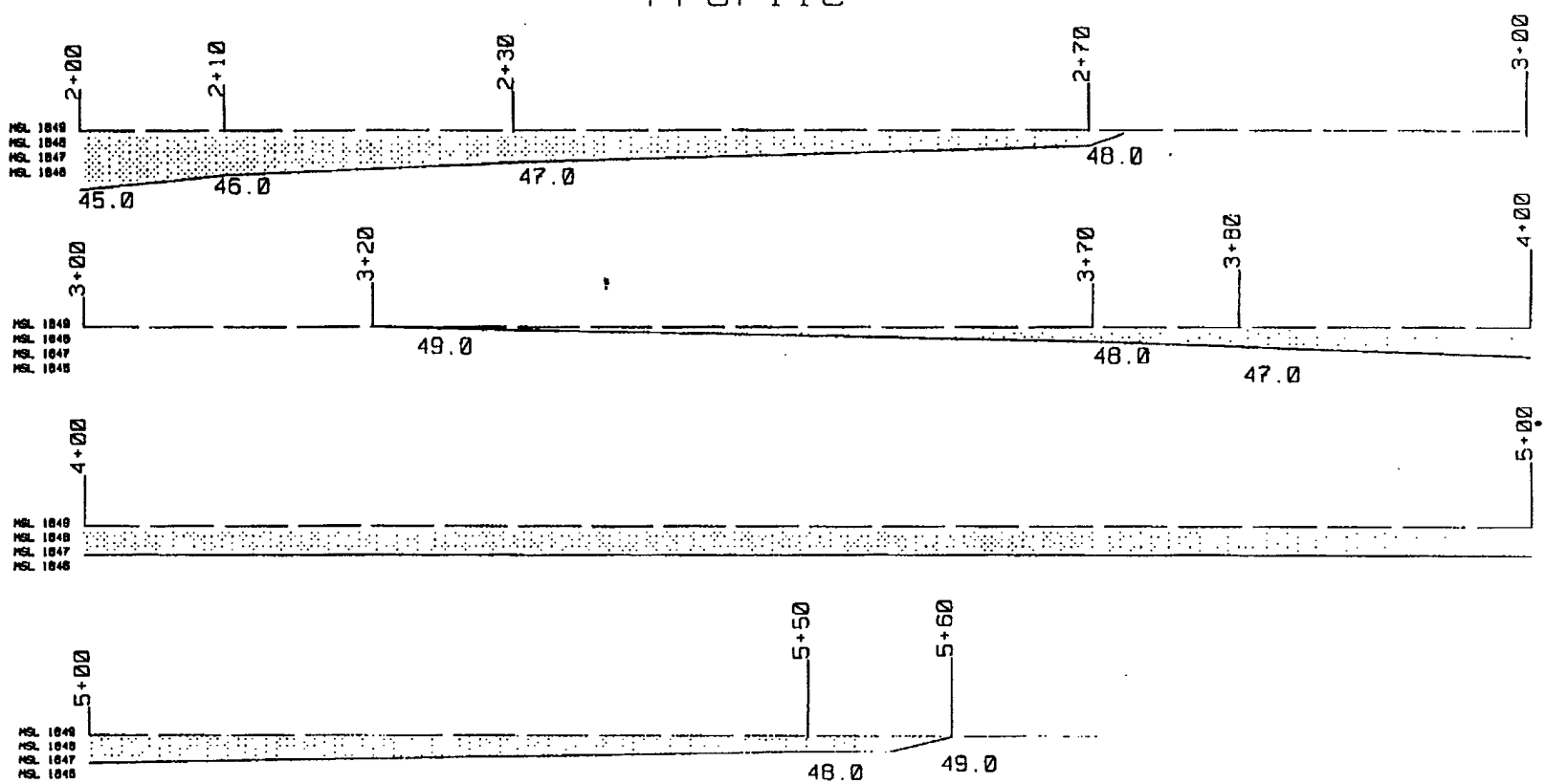
SITE NUMBER	LOCATION/ AREA	DESCRIPTION OF WORK	Dike - Rock Tons Required	Beach - Dredged Cubic Yards Required
Site #1	1A	Dike to be built with rock or dredged - Dike 1A is 360' long	232 154.6 cu.yds.	
	1B	Beach to be built to elev. 1849		9551
	1C	Beach to be built to elev. 1849		3388
Site #2	2	Dike - for lagoon to be built with rock - Dike2 is 1000' long	~~2444~~ 1629 cu. yds.	
Site #3	3A	Dike to be built with rock Dike 3A is 980' long	1903 1268.5 cu.yds.	
	3B	Beaches - built to 1849		9.293
		TOTAL TNS OR CY REQUIRED:	4579 3,052.1 cuyds.	22232

TOTAL AMOUNT OF MATERIAL= 25,284.1 cu.yds.

End. #2

PIPING PLOVER PROJECT #1
SITE 1A

Profile



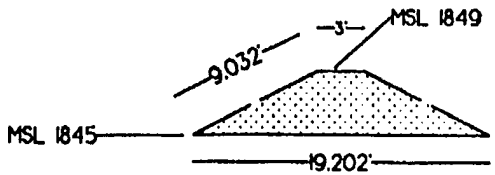
1. At Sta 3+00 make an approx. 90 degree turn and continue dike. see topo for sta. numbering and direction.
2. No work required after Station 5+60
3. See next sheet for cross-sections

D-6

Encl. #3

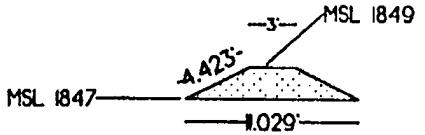
PIPING PLOVER PROJECT #1
SITE #1A - CROSS-SECTIONS

STA 2+20



44.563 sf

STA 2+70 &
STA 5+60



14.028 sf

——— existing lake bottom

fill area (rock or dredged)

– – – top of dike this job

Scale: 1" - 10'

See next sheet for quantities

Enl #4

PIPING PLOVER PROJECT #1 - SITE 1A

LOCATION:	Area	V=1/2 (A0 + A1)L/27	=	cys	x	1.5	=	tns
STATION								
2+00	44							
		1/2(44+44.563)20/27	=	32.8	x	1.5	=	49.2
2+20	44.463							
		1/2(44.563+14.028)50/27	=	54.3	x	1.5	=	81.45
2+70	14.028							
		1/2(14.028+0)10/27	=	2.6	x	1.5	=	3.9
2+80	0							

3+20	0							
		1/2(0+14.028)240/27	=	62.3	x	1.5	=	93.45
5+60	14.028							
		1/2(14.028+0)10/27	=	2.6	x	1.5	=	3.9
5+70	0							
TOTAL SITE 1A				154.6				231.9

Plan on double the amount of materials required if using dredge materials: 309.2 CYS REQUIRED

Encl #6

PIPING PLOVER PROJECT #1 - SITES 1B & 1C

Info based on topo dated 6/9/92 - Readings taken using LASICO Planimeter

LOCATION:	Acres	x	43,560 sf/ acre	=	Square Ft	x	Feet of Fill	=	cf	/	27 cf/ cy	=	cys	x	1.5	=	tns
Site 1B																	
Beach																	
Elev. 1845 - dredging	0.15	x	43,560	=	6534	x	4	=	26136	/	27	=	968	x	1.5	=	1452
Elev. 1846 - dredging	0.51	x	43,560	=	22215.6	x	3	=	66646.8	/	27	=	2468.4	x	1.5	=	3702.6
Elev. 1847 - dredging	0.26	x	43,560	=	11325.6	x	2	=	22651.2	/	27	=	838.93	x	1.5	=	1258.4
Elev. 1848 - dredging	0.31	x	43,560	=	13503.6	x	1	=	13503.6	/	27	=	500.13	x	1.5	=	750.2
TOTAL SITE 1B	1.23				53578.8				128937.6				4775.5				7163.2
* PLAN ON DOUBLE THE AMOUNT OF MATERIALS REQUIRED IF USING DREDGE MATERIALS =													9550.9	CYS REQUIRED			
Site 1C																	
Beach																	
Elev. 1846 - dredging	0.15	x	43,560	=	6534	x	3	=	19602	/	27	=	726	x	1.5	=	1089
Elev. 1847 - dredging	0.18	x	43,560	=	7840.8	x	2	=	15681.6	/	27	=	580.8	x	1.5	=	871.2
Elev. 1848 - dredging	0.24	x	43,560	=	10454.4	x	1	=	10454.4	/	27	=	387.2	x	1.5	=	580.8
TOTAL SITE 1C	0.57				24829.2				45738				1694				2541
* PLAN ON DOUBLE THE AMOUNT OF MATERIALS REQUIRED IF USING DREDGE MATERIALS =													3388	CYS REQUIRED			

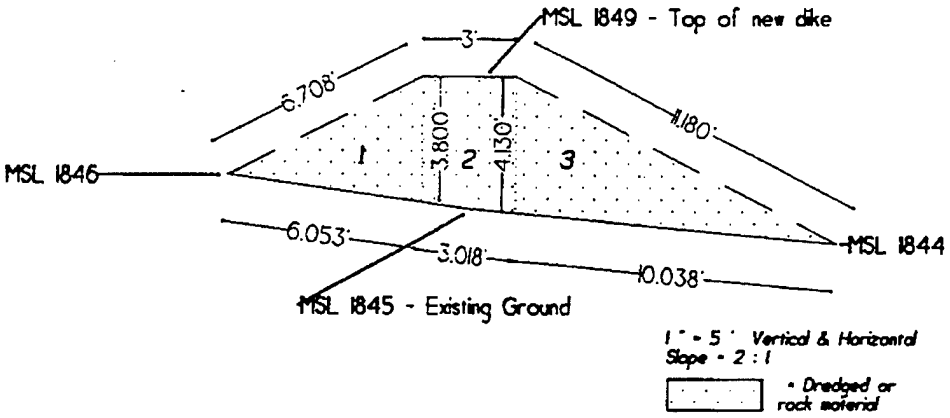
Encl #6

PIPING PLOVER PROJECT #1 - SITES 1B & 1C
Info based on topo dated 6/9/92 - Readings taken using LASICO Planimeter

LOCATION:	Acres	x	43,560 sf/ acre	=	Square Ft	x	Feet of Fill	=	cf	/	27 cf/ cy	=	cys	x	1.5	=	tns
Site 1B																	
Beach																	
Elev. 1845 - dredging	0.15	x	43,560	=	6534	x	4	=	26136	/	27	=	968	x	1.5	=	1452
Elev. 1846 - dredging	0.51	x	43,560	=	22215.6	x	3	=	66646.8	/	27	=	2468.4	x	1.5	=	3702.6
Elev. 1847 - dredging	0.26	x	43,560	=	11325.6	x	2	=	22651.2	/	27	=	838.93	x	1.5	=	1258.4
Elev. 1848 - dredging	0.31	x	43,560	=	13503.6	x	1	=	13503.6	/	27	=	500.13	x	1.5	=	750.2
TOTAL SITE 1B	1.23				53578.8				128937.6				4775.5				7163.2
* PLAN ON DOUBLE THE AMOUNT OF MATERIALS REQUIRED IF USING DREDGE MATERIALS =													9550.9				CYS REQUIRED
Site 1C																	
Beach																	
Elev. 1846 - dredging	0.15	x	43,560	=	6534	x	3	=	19602	/	27	=	726	x	1.5	=	1089
Elev. 1847 - dredging	0.18	x	43,560	=	7840.8	x	2	=	15681.6	/	27	=	580.8	x	1.5	=	871.2
Elev. 1848 - dredging	0.24	x	43,560	=	10454.4	x	1	=	10454.4	/	27	=	387.2	x	1.5	=	580.8
TOTAL SITE 1C	0.57				24829.2				45738				1694				2541
* PLAN ON DOUBLE THE AMOUNT OF MATERIALS REQUIRED IF USING DREDGE MATERIALS =													3388				CYS REQUIRED

PIPING PLOVER PROJECT #2
SITE #2

Typical Cross-Section of Dike



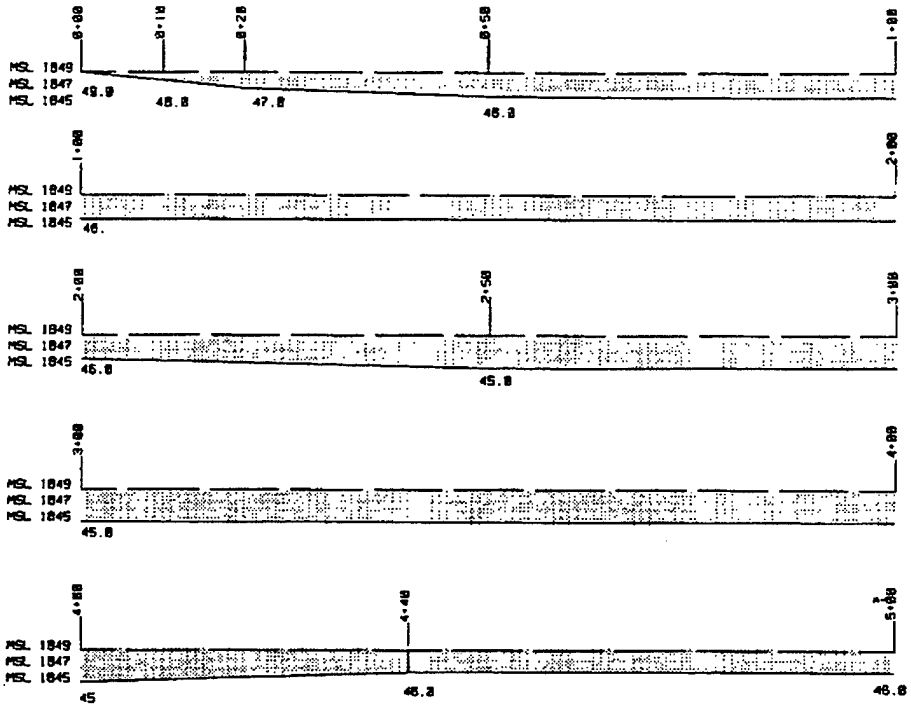
Area 1 - 11.48 sf
Area 2 - 12.013 sf
Area 3 - 20.489 sf
Total Area - 43.982 sf
say 43.98 sf

TOTAL MATERIALS REQUIRED:

Total Length of Site 2 - 1000 lf so
1000 lf x 43.98 sf/lf = 43980 cf
43980 cf / 27 = 1629 cys of rock or
2444 tns

End #7

PIPING PLOVER PROJECT #3
SITE 3A - Profile



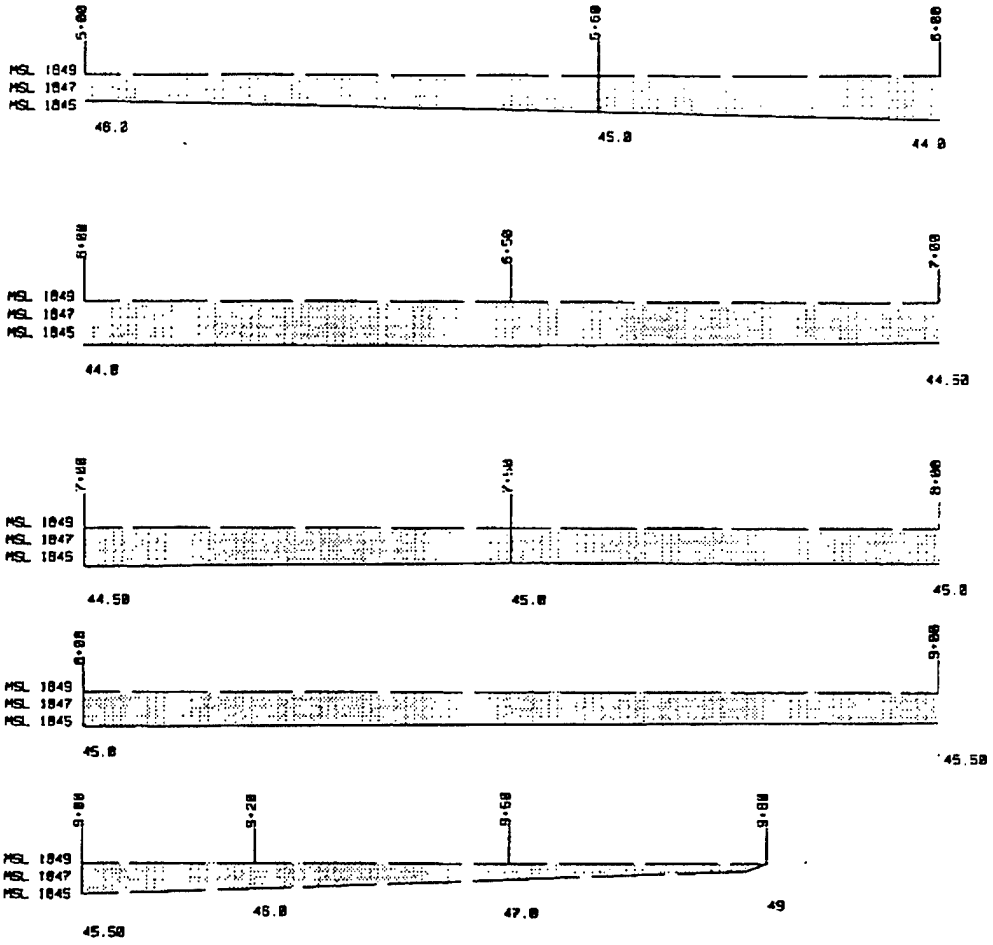
existing lake bottom — top of dike this job

fill area rock — Scale: 1" = 20'

Continued next sheet

Encl. #8

PIPING PLOVER PROJECT #3
SITE 3A - Profile

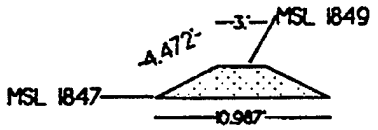


See next sheet for cross-sections

End #9

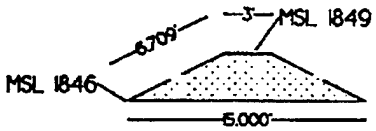
PIPING PLOVER PROJECT #3
SITE 3A - CROSS-SECTIONS

STA 0+20
STA 9+80



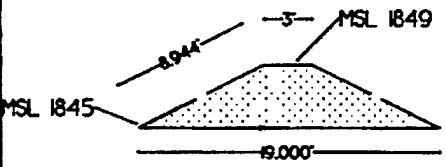
14.020 sf

STA 2+10
STA 5+60
STA 9+20



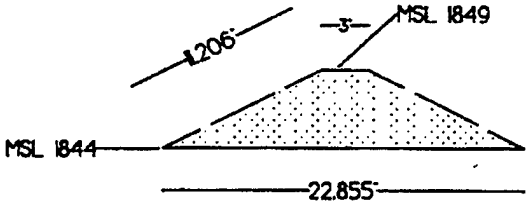
27 sf

STA 4+40



44.00sf

STA 6+60



64.645 sf

_ _ Top of dike

Existing lake bottom

Fill area

See next sheet for quantities

Encl #10

PIPING PLOVER PROJECT #3 - SITE 3A

LOCATION:	Area	V=1/2 (A0 + A1)L/27	=	cys	x	1.5	=	tns
STATION								
0+00	0							
		1/2(0+14.02)20/27	=	5.2	x	1.5	=	7.8
0+20	14.02							
		1/2(14.02+27)190/27	=	144.3	x	1.5	=	216.45
2+10	27							
		1/2(27+44)230/27	=	302	x	1.5	=	453
4+40	44							
		1/2(44+27)120/27	=	157.8	x	1.5	=	236.7
5+60	27							
		1/2(27+64.645)100/27	=	169.7	x	1.5	=	254.55
6+60	64.645							
		1/2(64.645+27)260/27	=	441.3	x	1.5	=	661.95
9+20	27							
		1/2(27+14.02)60/27	=	45.6	x	1.5	=	68.4
9+80	14.02							
		1/2(14.02+0)10/27	=	2.6	x	1.5	=	3.9
9+90	0							
TOTAL SITE 3A				1268.5				1902.75

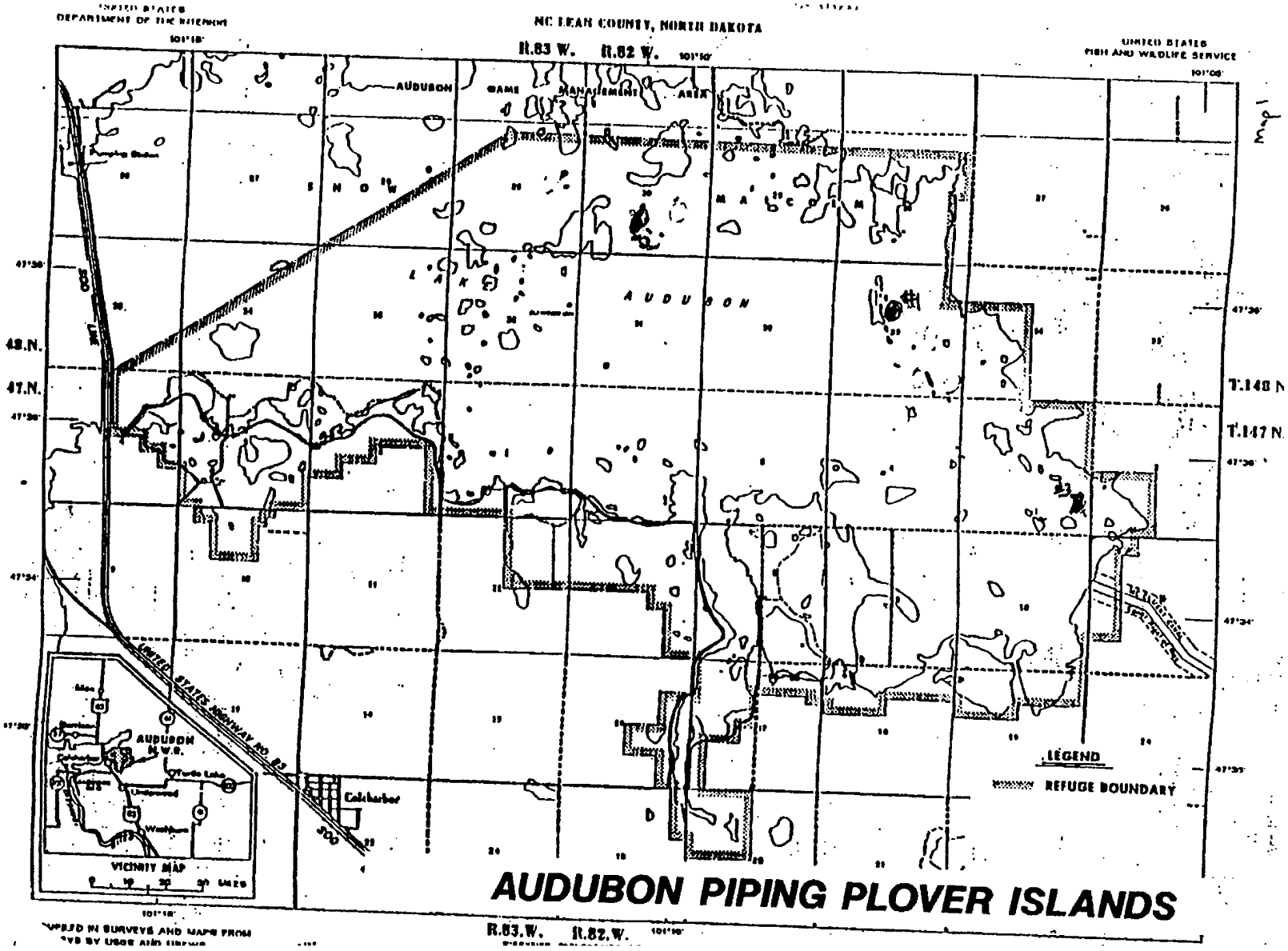
End #11

Encl #12

PIPING PLOVER PROJECT #3 - SITE 3B
Info based on topo dated 6/9/92 - Readings taken using LASICO Planimeter

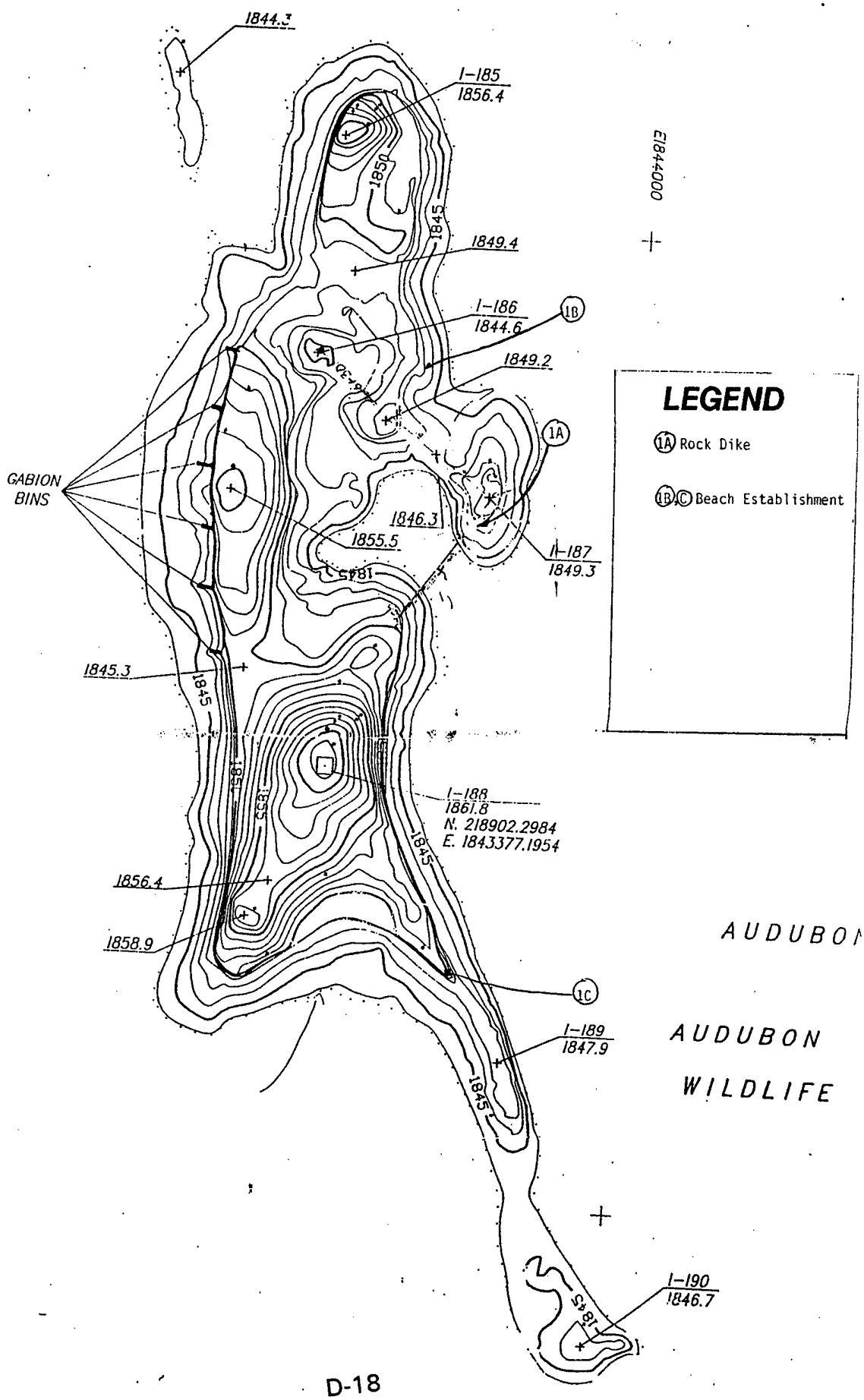
LOCATION:	Acres	x	43,560 sf/ acre	=	Square Ft	x	Feet of Fill	=	cf	/	27 cf/ cy	=	cys	x	1.5	=	tns
Site 3B Beach																	
Elev. 1846 - dredging	0.6	x	43,560	=	26136	x	3	=	78408	/	27	=	2904	x	1.5	=	4356
Elev. 1847 - dredging	0.49	x	43,560	=	21344.4	x	2	=	42688.8	/	27	=	1581.1	x	1.5	=	2371.6
Elev. 1848 - dredging	0.1	x	43,560	=	4356	x	1	=	4356	/	27	=	161.33	x	1.5	=	242
TOTAL SITE 3B	1.19				51836.4				125452.8				4646.4				6969.6

* PLAN ON DOUBLE THE AMOUNT OF MATERIALS REQUIRED IF USING DREDGE MATERIALS = 9292.8 CYS REQUIRED


MCLEAN COUNTY, NORTH DAKOTA
R.83 W.
R.82 W.
AUDUBON
GAME
MANAGEMENT
AREA
AUDUBON
48.N.
47.N.
T.148 N
T.147 N
UNITED STATES HIGHWAY NO. 83
AUDUBON N.W.R.
Coleharbor
VICINITY MAP
LEGEND
REFUGE BOUNDARY
AUDUBON PIPING PLOVER ISLANDS
R.83.W.
R.82.W.

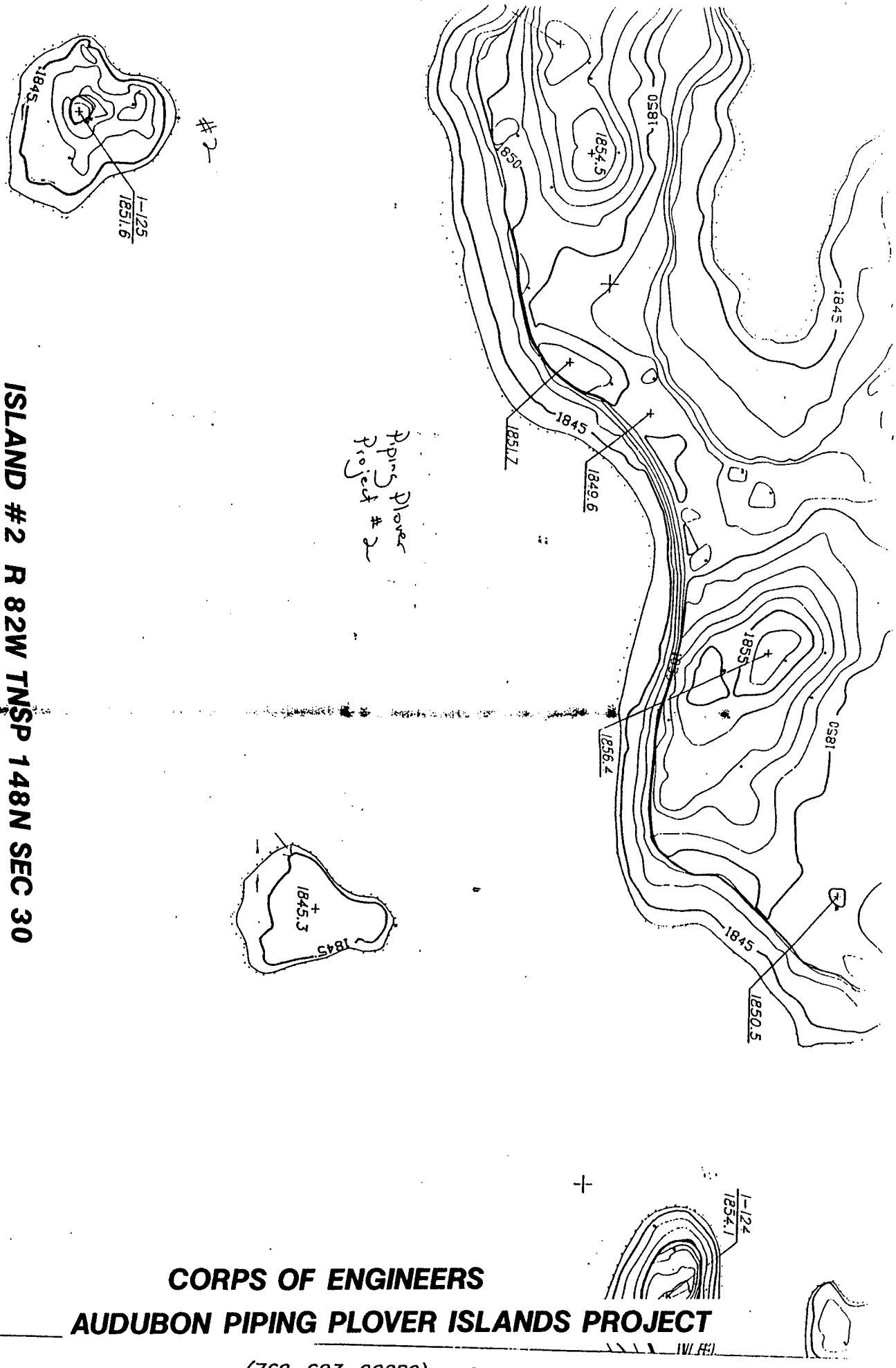
Piping Plover Project #1

ISLAND #1 R 82W TNSP 148N SEC 33



CORPS OF ENGINEERS

AUDUBON PIPING PLOVER ISLAND PROJECT

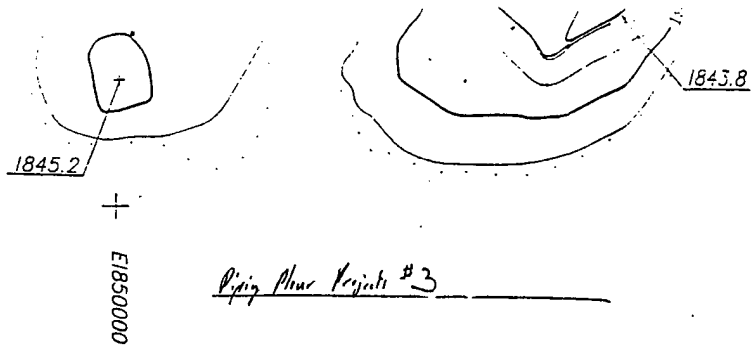


ISLAND #2 R 82W TNSP 148N SEC 30

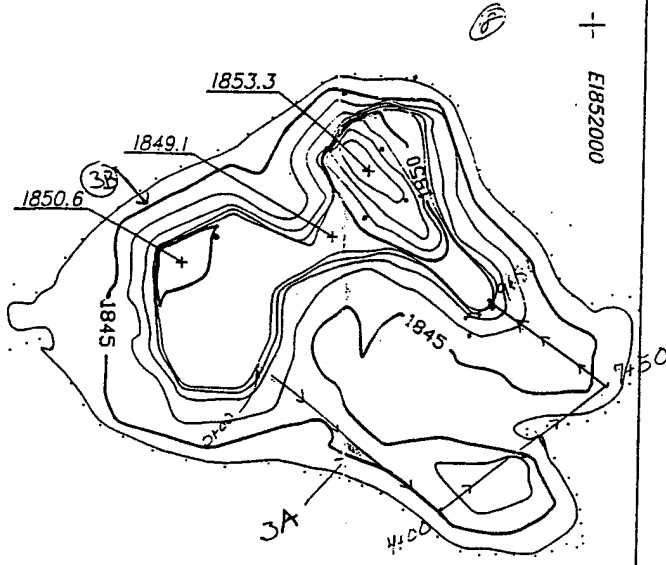
CORPS OF ENGINEERS

AUDUBON PIPING PLOVER ISLANDS PROJECT

(769-603-22089) D-19

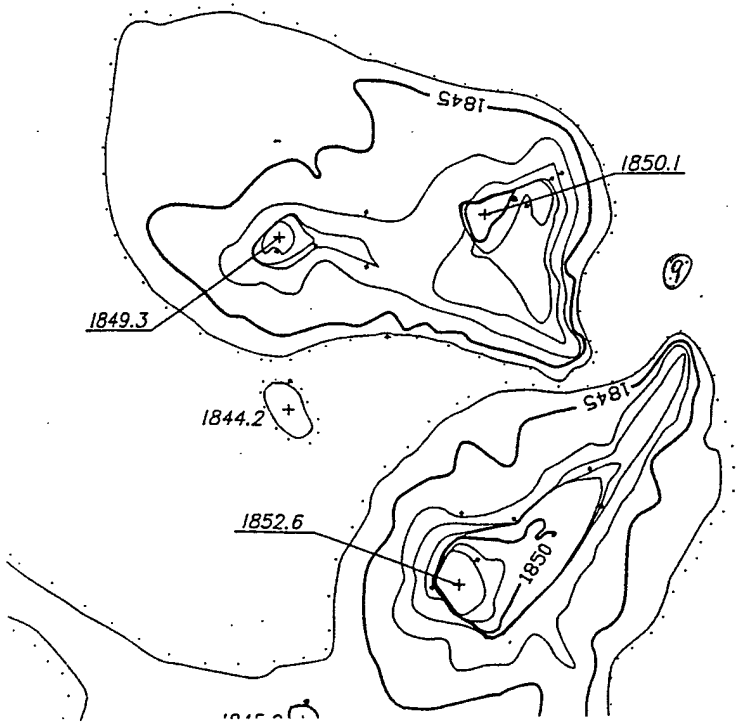


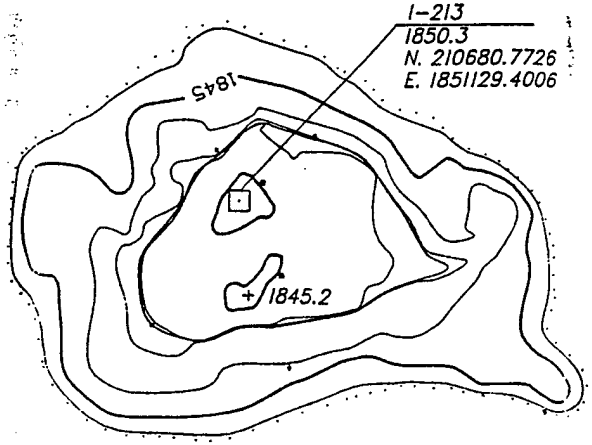
ISLAND #3 R 82W TNSP 147 N SEC 3



Build Rock Dike to form lagoon on an existing island

Dredge material to create beaches.





CORPS OF ENGINEERS

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APPENDIX E

SURVEYS AND MONITORING

1997 AT-A-GLANCE

INTERIOR LEAST TERN
(STERNA ANTILLARIUM)

Missouri River Population Survey & Productivity Monitoring - 1997

	ADULT CENSUS	MONITORED ADULT CEN	NESTS	NESTS HATCHED	NEST(a) SUCCESS	EGGS	AVE CLUTCH SIZE	EGGS HATCHED	MONITORED CHICKS FLEDGED	TOTAL CHICKS FLEDGED	FLEDGE(b) RATIO	COLLECTED NESTS	COLLECTED EGGS	COLLECTED RELEASED
Fort Peck Lake	0	0	0	0	0.0	0	0.00	0	0	0	0.00	0	0	0
Fort Peck River	162	30	17*	11*	64.7*	41*	2.41*	26*	8	43**	0.53	0	0	0
Lake Sakakawea	2	2	14	6	42.9	26	1.86	12	0	0	0.00	5	10	7
Garrison River	41	41	26	14	53.8	53	2.04	27	8	8	0.39	7	14	9
Lake Oahe	101	101	83	35	42.2	193	2.33	82	8	8	0.16	0	0	0
Fort Randall River	0	0	0	0	0.0	0	0.00	0	0	0	0.00	0	0	0
Lewis and Clark	60	60	34	25	73.5	91	2.68	65	47	47	1.57	0	0	0
Gavins Point River	115	115	106	49	46.2	266	2.51	132	52	52	0.90	0	0	0
TOTAL	481	349	280	140	50.0	670	2.39	344	123	158	0.66	12	24	16

a = Nests per 100 attempts
b = fledged chicks per pair of adult birds (Does not include collected fledged.)
* = Numbers represent monitored Reach subsample
** = Fledge Ratio x Adult Census Pairs

1997 AT-A-GLANCE

PIPING PLOVER
(CHARADIUS MELODUS)

Missouri River Population Survey & Productivity Monitoring - 1997

	ADULT CENSUS	MONITORED ADULT CEN	NESTS	NESTS HATCHED	NEST(a) SUCCESS	EGGS	AVE CLUTCH SIZE	EGGS HATCHED	MONITORED CHICKS FLEDGED	TOTAL CHICKS FLEDGED	FLEDGE(b) RATIO	COLLECTED NESTS	COLLECTED EGGS	COLLECTED RELEASED
Fort Peck Lake	0	0	0	0	0.0	0	0.00	0	0	0	0.00	0	0	0
Fort Peck River	23	9	6*	2*	33.3*	23*	3.83*	8*	4	10**	0.89	0	0	0
Lake Sakakawea	3	3	13	1	7.7	52	4.00	4	1	1	0.67	8	31	24
Garrison River	6	6	1	0	0.0	4	4.00	0	0	0	0.00	1	2	0
Lake Oahe	31	31	19	11	57.9	70	3.68	41	20	20	1.29	0	0	0
Fort Randall River	0	0	0	0	0.0	0	0.00	0	0	0	0.00	0	0	0
Lewis and Clark	32	32	17	11	64.7	66	3.88	40	20	20	1.25	0	0	0
Gavins Point River	22	22	14	7	50.0	50	3.57	23	0	0	0.00	0	0	0
TOTAL	117	103	70	32	45.7	265	3.79	116	45	51	0.87	9	33	24

a = Nests per 100 attempts
b = fledged chicks per pair of adult birds (Does not include collected fledged.)
* = Numbers represent monitored Reach subsample
** = Fledge Ratio x Adult Census Pairs

MAINSTEM MISSOURI RIVER PIPING PLOVER PRODUCTIVITY MONITORING, 1997.

REACH	NESTS	NEST HAT.	NEST COLL.	NEST SUCC.	EGGS	EGGS HAT.	EGGS COLL.	COLL. HAT.	FATE DESTROYED: FLOOD	PRED.	H. DIST.	BANK E.	WTHR.	LIVESTOCK	DEST. UNKN.	FATE UNKN.	ABAN.	NON VIABLE	ADULT CENSUS	CHICKS FLEDGE	COLL. CH. RELEASED
FTPKRES	0	0	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FTPKRIV	6	2	0	33.3	23	8	0	0	1	0	0	0	0	0	2	0	1	0	23	10	0
LKSKRES	13	1	8	7.7	52	4	31	28	4	0	0	0	0	0	0	0	0	0	3	1	24
GARRRIV	1	0	1	0.0	4	0	2	0	0	0	0	0	0	0	0	0	0	0	6	0	0
LKOHRES	19	11	0	57.9	70	41	0	0	1	0	1	0	1	0	1	3	1	0	31	20	0
FTRLRIV	0	0	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LECLRES	17	11	0	64.7	66	40	0	0	0	0	0	0	0	0	3	3	0	0	32	20	0
GAPTRIV	14	7	0	50.0	50	23	0	0	1	1	1	1	0	0	1	1	1	0	22	0	0
TOTAL	70	32	9	45.7	266	116	33	28	7	1	2	1	1	0	7	7	3	0	117	51	24

MAINSTEM MISSOURI RIVER LEAST TERN PRODUCTIVITY MONITORING, 1997.

REACH	NESTS	NEST HAT.	NEST COLL.	NEST SUCC.	EGGS	EGGS HAT.	EGGS COLL.	COLL. HAT.	FATE DESTROYED: FLOOD	PRED.	H. DIST.	BANK E.	WTHR.	LIVESTOCK	DEST. UNKN.	FATE UNKN.	ABAN.	NON VIABLE	ADULT CENSUS	CHICKS FLEDGE	COLL. CH. RELEASED
FTPKRES	0	0	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FTPKRIV	17	11	0	64.7	41	28	0	0	0	0	0	0	2	0	1	2	1	0	162	8	0
LKSKRES	14	6	5	42.9	28	12	10	9	0	0	1	0	0	0	0	0	0	2	2	0	7
GARRRIV	26	14	7	53.8	53	27	14	10	0	3	1	0	1	0	0	0	0	0	41	8	9
LKOARES	83	35	0	42.2	193	82	0	0	4	1	0	0	13	1	3	17	5	4	101	8	0
FTRLRIV	0	0	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LECLRES	34	26	0	73.5	91	66	0	0	1	1	0	0	0	0	0	6	2	0	60	47	0
GAPTRIV	106	49	0	46.2	266	132	0	0	9	7	0	4	2	0	17	7	10	1	116	52	0
TOTAL	280	140	12	50.0	670	344	24	19	14	12	2	4	18	1	21	31	18	7	481	123	16

Endangered Species Report

Missouri River Basin - System Summary - May 4 - May 9, 1997

Lake Sakakawea: The lower lake was surveyed on May 5. Two plovers and several nest scrapes were observed at Steinke Bay. The Upper lake was surveyed on May 7. Four plovers were observed at Little Egypt, four plovers at Tobacco Garden Bay, and two plovers at White Earth Bay. No nest scrapes or nests were found at any of the three locations.

Garrison River Reach: The Missouri River from RM 1389.8 to RM 1355.0 was surveyed on May 9. Two plovers were observed on the island at RM1380.0 but no nest scrapes were found. Plenty of habitat exists at the current level releases of 21,000 cfs from Garrison Dam. This will all be inundated next week when releases are increased to 40,000 cfs.

Lewis & Clark Lake: The Niobrara River north of the Highway 12 Bridge was checked on May 7. Twentyfive piping plovers and two semi-palmated plovers were observed. A plover was seen on a nest but when examined no eggs were found in the nest bowl. Among the twentyfive piping plovers was one with a blue flag on the right leg and a USFWS band. The plover is the first captive reared bird seen this year. It is not known if the plover was a 1995 or 1996 released bird.

Gavins Point River Reach: The area around RM 804.6 and 804.5 was surveyed on May 8. Very little habitat was available due to high releases (60,000 cfs) out of Gavins Point Dam. What habitat that was available is vegetated and marginal. One pair of piping plovers was observed. Neither was flagged.

Endangered Species Report

Missouri River Basin - System Summary - May 11 - May 16, 1997

Fort Peck River Reach: The Missouri from the Montana border to Lake Sakakawea was surveyed but no plovers were observed.

Lake Sakakawea: On the lower lake three plovers and nest scrapes were found at Steinke Bay. Lake Audubon, Garrison Bay, Douglas Bay, and Beaver Creek Bay were surveyed but no birds were found. On the upper lake Little Egypt was surveyed but the plovers that were there last week were not seen. No nests were found on Lake Sakakawea.

Garrison River Reach: The Missouri River from RM 1389.8 to RM 1355.0 was surveyed on May 16. Seven plovers and nest scrapes were observed on the island at RM1380.0 Ten plovers and nest scrapes were observed on the sandbar at RM 1356.1 No nests were found. Releases from Garrison Dam on May 16 were 32,000 cfs are expected to rise to 40,000 cfs by May 21.

Lake Oahe: Two plover nests were found at Little Bend. A pair of plovers and nest scrapes were found at Plum Creek. For the third year in a row a plover has set up housekeeping at the Indian Creek parking lot. A nest with four eggs was found. Project staff will attempt to move the nest to a more secure area of the parking lot.

Fort Randall Reach: The island at RM 869 was checked on May 12. The island is 85% inundated and no birds were observed. The island at RM 866.6 was not checked but it is believed to be submerged. Releases out of Fort Randall Dam are expected to rise from 51,000 cfs to 56,000 cfs next week.

Lewis & Clark Lake: The Niobrara River around the Highway 12 Bridge was checked on May 15. North of the bridge one plover nest containing two eggs was found. Five pairs and two single plovers were seen north of the bridge. Single plovers were seen south and west of the bridge. Four semi-palmated plovers were seen west of the bridge. The banded plover was again seen. He was paired up with another plover a little northwest of where he was seen last week.

Gavins Point River Reach: The river was not surveyed this week. Releases out of Gavins Point remain high (60,000 cfs) and are expected to continue at this level through the summer.

System Total: 4 Plover nests (all new).

Endangered Species Report

Missouri River Basin - System Summary - May 25 - May 30, 1997

Fort Peck Lake: The lake was surveyed on May 29. One piping plover was observed on a beach south of the Rock Creek Marina. Suitable nesting habitat remains limited due to the high level of Fort Peck Lake.

Fort Peck River Reach: The Missouri River was surveyed on May 30. One plover nest was found at RM 1674.6 and one plover nest was found at RM 1685.6. Four least terns were observed but no tern nests were found. No birds of either species were found on the Missouri from the North Dakota border to Lake Sakakawea.
Total: 2 plover nests (2 new)

Lake Sakakawea: On the lower lake a plover nest was found at Little Field Bay in the Van Hook Arm. Plovers were also observed at Steinke Bay, Douglas Creek Bay, Beaver Creek Bay, and Mallard Island but no additional nests were found.
Total: 1 plover nest (1 new)

Garrison River Reach: The river to RM 1355 was not surveyed. On the river from RM 1355 to RM 1300 a pair of plovers and a tern were seen at RM 1354 and a tern was observed at RM 1340. No nests were found.

Lake Oahe: The plover nests at Little Bend and Indian Creek continue to do fine. Three plover nests were found on Dredge Island (RM 1270). One least tern was observed at Dredge.
Total: 5 plover nests (3 new)

Fort Randall Reach: The Missouri River below Fort Randall Dam was surveyed on May 29. The island at RM 869 is 90% inundated. All other habitat is under water. No adults of either species were observed. Releases out of Fort Randall Dam were 55,500 cfs.

Lewis & Clark Lake: The upper portion of Lewis & Clark Lake was surveyed on May 30. One least tern was observed. Very little habitat was seen as the lake continues to rise. The mouth of the Niobrara was surveyed on May 30. The plover nest from last week was destroyed however three new plover nests were found. Around 30 plovers were seen. The flagged plover was seen again, this time sitting on a nest bowl, but no eggs yet. Six least terns were observed but no nests were found. Due to rain over the past week the Niobrara has risen and about 40% of the habitat seen last week has water running over it.
Total: 3 plover nests (3 new 1 destroyed)

Gavins Point River Reach: The Missouri was surveyed from RM 806 to RM 801 and from RM 794.5 to RM 754. Several least terns but no piping plovers were seen. No nests were found. Very little habitat is available on the river. What habitat that exists is marginal and can be washed by wave action. Releases out of Gavins Point continue at 60,00 cfs.

System Total: 11 plover nests (9 new, 1 destroyed)

Special Note: Nebraska Game & Parks Commission biologists found a second flagged plover. The plover was seen at a sand pit near Valley Nebraska sitting on a nest incubating four eggs. Valley is about twenty miles northwest of Omaha.

Endangered Species Report

Missouri River Basin - System Summary - May 31 - June 6, 1997

Fort Peck Lake: The lake was surveyed on June 4. No birds of either species were seen. Nesting habitat continues to be lost due to the rising of Fort Peck Lake.

Fort Peck River Reach: The Missouri River was surveyed on June 4 & 5. The two plover nests found last week were both lost, cause unknown. One new plover nest was found at RM 1681.2. This nest was moved several times due to the rising of the river. Releases from Fort Peck Dam were increased from 12,500 cfs to 15,000 cfs. Releases are expected to remain at 15,000 for the rest of the summer. No birds of either species were found on the Missouri from the North Dakota border to Lake Sakakawea.
Total: 1 plover nest (1 new, 2 destroyed)

Lake Sakakawea: No birds of either species were found on the upper lake. On the lower lake the plover nest at Little Field Bay in the Van Hook Arm continues to be incubated. New plover nests were found at the following locations; Mallard Island - 1 nest, Steinke Bay - 2 nests, Steinke Bay Habitat Area - 1 nest, Douglas Creek Bay - 1 nest, Beaver Creek Bay - 1 nest, Deepwater Bay - 1 nest, and Independence Point - 2 nests. No terns were seen on the lower lake.
Total: 10 plover nests (9 new)

Garrison River Reach: The Missouri from RM 1380 to RM 1355 was surveyed on June 3. One plover nest with three eggs was found on Rerag Island at RM 1380. Fourteen terns were seen but no nests were found. The Missouri from RM 1355 to RM 1338 was surveyed during the week. Two plovers and a tern were observed at RM 1354 and two plovers were observed at RM 1340. No nests were found. Releases out of Garrison Dam continues at 40,000 cfs.
Total: 1 plover nest (1 new)

Lake Oahe: The plover nest at Little Bend continues to be incubated. The plover nest at Indian Creek was destroyed. Humans are suspected in the nest destruction and the U.S. Fish & Wildlife Service has been notified. Three new plover nests were found on Dredge Island to go with the two plover nests found there last week. One new plover nest was found at Mission and three new plover nests were found at Swift Bird. Twelve terns were seen between Whitlock and Swift Bird and four terns were seen at Porcupine Island. No nests were found however.
Total: 10 plover nests (7 new, 1 destroyed)

Fort Randall Reach: The Missouri River below Fort Randall Dam was surveyed on June 4. The island at RM 869 is 85% inundated and the island at RM 866.6 is 99% inundated. All other habitat is under water. No adults of either species were observed. Releases out of Fort Randall Dam were 54,000 cfs.

Lewis & Clark Lake: The mouth of the Niobrara was surveyed on June 6. Two of the three plover nests found last week were destroyed. Three new plover nests were found. The flagged plover was again seen, but no nest was found associated with that plover. Between 25 to 30 plovers were seen. Eight least terns were seen and several nest bowls were found, but no tern nests were observed.
Total: 4 plover nests (3 new, 2 destroyed)

Gavins Point River Reach: The Missouri was not surveyed this week as the staff was at training in North Dakota. Releases out of Gavins Point continue at 60,00 cfs.

System Total: 26 plover nests (21 new, 5 destroyed)

Special Notes:

1. T&E Training for summer rangers was conducted by Casey Kruse and Greg Pavelka at Riverdale ND on June 2 & 3. A total of 23 Corps employees from the Fort Peck, Garrison, Oahe, Fort Randall, and Gavins Point Projects, and one employee of the Three Affiliated Tribes Game & Fish Department attended the two day training.

2. Nebraska Game & Park Commission biologists captured the flagged plover they found last week. The USFWS band on the plover identified it as one day old chick that was collected off the Missouri at RM 759 on July 25, 1995. The plover was raised at Gavins Point and was released on the Platte River near Ashland Nebraska on August 31, 1995.

Endangered Species Report

Missouri River Basin - System Summary - June 7 - June 14, 1997

Fort Peck Lake: The lake was surveyed on June 12. Six terns and one plover were seen on Beach 5. Due to adverse weather conditions the boat could not be landed to check for nests. However tern nests are suspected due to the agitation of the terns. If nests are at Beach 5 they may be flooded out within the next two weeks due to the rising of Fort Peck Lake.

Fort Peck River Reach: The Missouri River was surveyed on June 10 - 12. The plover nest found at RM 1681.2 last week was lost to flooding. Two tern nests were found at RM 1699.7, one tern nest at RM 1690.2, one plover nest and one tern nest at 1685.6, two tern nests at RM 1677, and two tern nests and one plover nest at RM 1674. 6. Releases from Fort Peck Dam continued at 15,000 cfs. Surveys on the North Dakota portion of the river have been suspended due to high flows from the Yellowstone River. (The Missouri at the confluence with the Yellowstone was running at 105,000 cfs last week.)
Total: 2 plover nests (2 new, 1 destroyed) 8 tern nests (8 new)

Lake Sakakawea: The lake was surveyed on June 10-12. On the upper lake a plover nest was found near New Town. On the lower lake the plover nest at Little Field Bay in the Van Hook Arm was joined by five new tern nests. Plover nests were lost to flooding at Steinke Bay, Deepwater Bay, and Douglas Creek Bay. One new plover nest was found at Beaver Creek Bay and one new plover nest was found south of Parshall Bay. Plover nests continued to be incubated at the following locations; Mallard Island - 1 nest, Steinke Bay - 1 nest, Steinke Bay Habitat Area - 1 nest, Beaver Creek Bay - 1 nest, and Independence Point - 2 nests.

On June 14 the eggs from all the nests except the plover nests at the Steinke Habitat Area and the area south of Parshall Bay were removed and transported to the Gavins Point Project for captive rearing. The removal was necessitated by the elimination of habitat caused by the rising of Lake Sakakawea. Of the two plover nests left on the lake, the nest at Steinke was not endangered and the nest south of Parshall Bay could not be reached due to boat problems. A total of 31 plover and 10 tern eggs were transported to Gavins Point.
Total: 2 plover nests (3 new, 3 destroyed, 8 collected) 0 tern nests (5 new, 5 collected)

Garrison River Reach: The Missouri from RM 1380 to RM 1355 was surveyed on June 10. One plover nest remains on Rerag Island at RM 1380. The Missouri from RM 1355 to RM 1338 was surveyed during the week. Two plovers and a tern were observed at RM 1354, one plover and one tern were observed at RM 1340, and one tern was seen feeding at RM 1320. No nests were found. Releases out of Garrison Dam are now at 41,000 cfs.
Total: 1 plover nest

Lake Oahe: The plover nest at Little Bend has hatched and four plover chicks were observed. Two new plover nests and one new tern nest were found at Little Bend. One plover nest

continues to incubate at Mission. The three plover nests found at Swift Bird have been joined by ten tern nests. The five plover nests at Dredge Island have been joined by another plover nest and nine tern nests.
Total: 12 plover nests (1 hatched, 3 new), 4 plover chicks, 20 tern nests (20 new)

Fort Randall Reach: The Missouri River below Fort Randall Dam was surveyed on June 9. The island at RM 869 is 85% inundated and the island at RM 866.6 is 99% inundated. All other habitat is under water. No adults of either species were observed. Releases out of Fort Randall Dam were 54,000 cfs..

Lewis & Clark Lake: Lewis & Clark Lake was surveyed on June 9. Four terns were observed fishing but no nests were found. Some marginal habitat exists on the lake. The mouth of the Niobrara was surveyed on June 13. The four plover nests from last week were still good. Five more plover nests and 12 tern nests were found. The majority of the nests were found in the area between the Highway 12 Bridge and the first bend to the north. The flagged plover was again seen in the same area. The bird was alone and does not appeared to have mated yet. The water level on the Niobrara has gone down and habitat may be available to the west of the bridge.
Total: 9 plover nests (5 new) 12 tern nests (12 new)

Gavins Point River Reach: The Missouri was surveyed on June 10 - 12. One plover nest was found at 804.4, one plover and three tern nests were found at 801, two tern nests were found at 778, one tern nest was found at 775.5, three tern nests were found at 770, and one plover nest and five tern nests were found at 759.7. Some habitat has become available as flows from the James and Vermillion Rivers have decreased. Releases out of Gavins Point continue at 60,00 cfs.
Total: 3 plover nests (3 new) & 14 tern nests (14 new)

System Total: 29 plover nests (1 hatched, 16 new, 4 destroyed, 8 collected), 4 plover chicks, 54 tern nests (59 new, 5 collected)

Special Notes:

1. John make my prime rib medium Dinan of the Nebraska Game & Parks Commission pointed out that until the band number is verified on the flagged plover on the Niobrara, it is only a possible find in regards to it being a Gavins Point captive reared bird. Therefore Nebraska, like it's football team, claims to be Number 1 in the plover sweepstakes. We partially acknowledge the claim and first verification status goes to the Cornhuskers.

Endangered Species Report

Missouri River Basin - System Summary - June 15 - June 21, 1997

Fort Peck Lake: The lake was surveyed on June 17 & 20. No birds of either species were seen. Habitat continues to go under as the lake rises.

Fort Peck River Reach: The Missouri River was surveyed on June 16-18. Surveys on the North Dakota portion of the river have been suspended due to high flows from the Yellowstone River. The survey results for the past week are as follows:
RM 1699.7 - 2 tern nests
RM 1690.2 - 1 tern nest
RM 1685.6 - 1 plover nest, 1 tern nest
RM 1677.0 - 3 tern nests (1 new)
RM 1674.6 - 1 plover nest, 3 tern nests (1 new)

Total: 2 plover nests, 10 tern nests (2 new)

Lake Sakakawea: The one plover nest at the Steinke Bay habitat area hatched and one chick was observed. The plover nest south of Parshall Bay was not checked but was believed to have been lost due to flooding.
Total: 0 plover nest (1 hatched, 1 destroyed)

Garrison River Reach: The Missouri from RM 1380 to RM 1355 was surveyed on June 16. One plover nest remains on Rerag Island at RM 1380. The Missouri from RM 1355 to RM 1338 was surveyed during the week. Two terns and one plover were observed at RM 1354 and two plovers were observed at RM 1340. No nests were found. Releases out of Garrison Dam remain at 41,000 cfs.
Total: 1 plover nest

Lake Oahe: The survey results for the past week are as follows:
Mission (RM 1104): 0 plover nests (1 hatched) 4 plover chicks 1 tern nest (1 new)
Little Bend (RM 1108-1109): 3 plover nests (2 new, 1 abandoned) 5 terns (4 new)
Swift Bird (RM 1158): 1 plover nest (2 hatched), several plover chicks, 14 tern nests (4 new)
Porcupine Island (RM 1249): 1 tern nest (1 new)
Dredge Island (RM 1270): 7 plover nests (1 new) 15 tern nests (6 new)
Total: 11 plover nests (3 hatched, 1 new, 1 abandoned), several plover chicks, 36 tern nests (16 new)

Fort Randall Reach: The Missouri River below Fort Randall Dam was surveyed on June 16. The island at RM 869 is 85% inundated and the island at RM 866.6 is 99% inundated. All other habitat is under water. No adults of either species were observed. Releases out of Fort Randall

Dam were increased 1,000 cfs to 55,000 cfs.

Lewis & Clark Lake: Lewis & Clark Lake was surveyed on June 19. No birds of either species were seen. The mouth of the Niobrara was surveyed on June 20. The flagged plover was again seen in the same area. The bird was alone and remains a bachelor. The results of the survey are as follows:
13 plover nests (4 new) 22 tern nests (12 new, 1 destroyed, 1 abandoned)

Gavins Point River Reach: The Missouri was surveyed on June 16 - 18. Status is as follows:
RM 804.4 - 1 plover nest
RM 801.5 - 4 tern nests (4 new)
RM 801.0 - 1 plover nest & 3 tern nests
RM 778.0 - 3 tern nests (2 new, 1 destroyed)
RM 775.5 - 3 tern nests (2 new)
RM 771.0 - 1 tern nest (1 new)
RM 770.8 - 1 tern nest (1 new)
RM 770.0 - 11 tern nests (9 new, 1 destroyed)
RM 759.0 - 1 plover nest & 4 tern nests (1 destroyed)
Releases out of Gavins Point continue at 60,000 cfs.
Total: 3 plover nests & 30 tern nests (19 new, 3 destroyed)

System Total: 30 plover nests (4 hatched, 5 new, 1 destroyed, 1 abandoned), several plover chicks, 98 tern nests (49 new, 4 destroyed, 1 abandoned)

Special Notes:

1. As of June 23, sixteen plovers from five clutches have hatched out at the Gavins Point Project. Twelve plover and ten tern eggs continue to be incubated. Three plover eggs have been removed as infertile.

2. Stacy Adolf reported she has 180 nests on the four sections of the Niobrara River that she and her crew are monitoring.

3. For the project offices; remember this week and next are the times to be doing the Adult Census.

4. Casey Kruse and Robyn Niver will be attending the Missouri River Natural Resources Council Tern & Plover Team meeting in Nebraska City NE on June 24 & 25, 1997.

Endangered Species Report

Missouri River Basin - System Summary - June 22 - June 28, 1997

Fort Peck Lake: The lake was surveyed during the past week. No birds of either species were seen. Virtually no habitat is available as the lake approaches a record high.

Fort Peck River Reach: The Missouri River was surveyed on June 25-27. The survey results for the past week are as follows:
RM 1725.8* - 2 tern nests
RM 1699.7 - 3 tern nests (1 new)
RM 1690.2 - 1 plover nest (1 new) 1 tern nest
RM 1685.6 - 1 plover nest, 1 tern nest
RM 1677.0 - 3 tern nests (1 hatched, 1 new)
RM 1674.6 - 1 plover nest, 3 tern nests
RM 1659.2* - 2 plover nests, 2 tern nests
RM 1643.0* - 2 tern nests
RM 1609.4* - 2 plover nests, 2 tern nests
RM 1593.0* - 2 plover nests, 31 tern nests
*These sites are outside of the subsample survey area and were discovered during the adult census. These nests are not included in the subsample totals below. Releases out of Fort Peck Dam were reduced to 7,000 cfs from 15,000 cfs during the week due to heavy rainfall in the watershed below the dam.
Total: 3 plover nests, 11 tern nests (1 hatched, 2 new) 1 tern chick
Adult Census: 23 plovers and 162 terns
Lake Sakakawea: One tern nest was found on the Williston Levee. One plover chick continues to be seen at the Steinke Bay habitat area.
Total:1 plover chick, 1 tern nest (1 new)

Garrison River Reach: The Missouri from RM 1380 to RM 1355 was surveyed on June 24. A nine tern nest colony was discovered at RM 1367.5. Due to a forecast of increased releases from Garrison Dam, rescue measures were implemented. Seven of the tern nests were collected, with the other two nests having been lost. The plover nest at RM 1380 was also collected. A total of fourteen tern eggs and two plover eggs were collected and transported to the Gavins Point Project for incubation. No nests for either species was found on the Missouri from Rm 1355 to RM 1300. Releases from Garrison Dam were increased to 48,500 cfs on June 27 and are expected to go to 50,000 cfs on the 28th.
Total: 0 plover nests (1 collected) 0 tern nests (9 new, 7 collected, 2 destroyed)

Lake Oahe: The survey results for the past week are as follows:
Mission (RM 1104): 4 plover chicks 1 tern nest
Little Bend (RM 1108-1109): 3 plover nests, 4 terns (1 status unknown)

Swift Bird (RM 1158): 1 plover nest, several plover chicks, 10 tern nests (4 status unknown)
Porcupine Island (RM 1249): 0 tern nests (1 destroyed)
Dredge Island (RM 1270): 7 plover nests, 19 tern nests (5 new, 1 destroyed)
Total: 11 plover nests, several plover chicks, 34 tern nests (5 new, 2 destroyed, 5 status unknown)

Fort Randall Reach: The Missouri River below Fort Randall Dam was surveyed on June 16. The island at RM 869.is 90% inundated and the island at RM 866.6is completely inundated. All other habitat is under water. No adults of either species were observed. Releases out of Fort Randall Dam were increased 500 cfs to 55,500 cfs.

Lewis & Clark Lake: Lewis & Clark Lake was not surveyed during the week. The mouth of the Niobrara was surveyed on June 27. The flagged plover was not seen this week. Two plover nests hatched with two chicks observed. The results of the survey are as follows:
11 plover nests (2 hatched,1 new, 1 status undetermined) 26 tern nests (5 new, 1 status unknown)
Adult Census - 30 Piping Plovers, 54 Least Terns

Gavins Point River Reach: The Missouri was surveyed on June 23 - 26. Status is as follows:
RM 804.5 - 5 tern nests (5 new)
RM 804.4 - 1 plover nest
RM 801.5 - 0 tern nests (3 destroyed, 1 abandoned)
RM 801.0 - 1 plover nest & 0 tern nests (3 destroyed)
RM 778.0 - 12 tern nests (10 new, 1 destroyed)
RM 776.5 - 2 tern nests (2 new)
RM 776.0 - 2 tern nests (2 new)
RM 775.5 - 6 tern nests (3 new)
RM 771.0 - 1 tern nest
RM 770.8 - 0 tern nests (1 destroyed)
RM 770.0 - 1 plover nest (1 new) 14 tern nests (7 new, 4 destroyed)
RM 768.5 - 4 tern nests (4 new)
RM 759.0 - 1 plover nest & 5 tern nests (2 new, 1 destroyed)
Releases out of Gavins Point continue at 60,000 cfs.
Total: 4 plover nests (1 new) & 51 tern nests (35 new, 13 destroyed, 1 abandoned)
Adult Census - 22 Piping Plovers 115 Least Terns

System Total: 29 plover nests (2 hatched, 2 new, 1 collected, 1 status undetermined), several plover chicks, 123 tern nests (1 hatched, 57 new, 17 destroyed, 7 collected, 1 abandoned, 6 status unknown), 1 tern chick

Special Notes:

1. As of June 27, 21 plovers from six clutches have hatched out at the Gavins Point Project. 6 plover and 24 tern eggs continue to be incubated. 1 plover egg was removed after it was determined the embryo was not viable.

2. Casey Kruse and Robyn Niver attended the Missouri River Natural Resources Council Tern & Plover Team meeting in Nebraska City NE on June 24 & 25, 1997.

3. The adult census for the reaches began this past week. The census should be completed by the end of this week.

Endangered Species Report

Missouri River Basin - System Summary - June 30 - July 4, 1997

Fort Peck Lake: With all habitat inundated by Fort Peck Lake, surveys of the lake have been suspended.

Fort Peck River Reach: The Missouri River was surveyed on July 2 -3. The survey results for the past week are as follows:
RM 1699.7 - 1 tern nest (1 hatched, 1 abandoned) 1 tern chick
RM 1690.2 - 1 plover nest 0 tern nests (1 hatched) 3 dead tern chicks recovered
RM 1685.6 - 1 plover nest, 1 tern nest
RM 1677.0 - 3 tern nests (1 hatched, 1 new) 2 tern chicks
RM 1674.6 - 1 plover nest, 1 tern nest (1 hatched, 1 fate unknown) 2 dead tern chicks recovered
Releases out of Fort Peck Dam continue at 7,000 cfs.
Total: 3 plover nests, 6 tern nests (4 hatched, 1 new, 1 abandoned, 1 fate unknown) 3 tern chicks
Adult Census: 23 plovers and 162 terns

Lake Sakakawea: The one tern nest on the Williston Levee was destroyed. One plover chick continues to be seen at the Steinke Bay habitat area. Surveys of the lake have been suspended as the lake has moved above 1854 feet msl.
Total: 1 plover chick, 0 tern nests (1 destroyed)
Adult Census: 3 plovers and 0 terns

Garrison River Reach: A tern colony of ten nests was discovered at Southport, a riverside development near Bismarck at RM 1314. Releases from Garrison Dam were increased to 57,000 cfs by July 6.
Total: 10 tern nests (10 new)
Adult Census: 6 plovers and 41 terns

Lake Oahe: The survey results for the past week are as follows:
Mission (RM 1104): 1 tern nest
Little Bend (RM 1108-1109): 1 plover nest, (1 fate unknown, 1 destroyed) 1 tern nest (3 fate unknown)
Swift Bird (RM 1158): 1 plover nest, 0 tern nests (10 destroyed - weather)
Porcupine Island (RM 1249): 3 tern nests (3 new)
Dredge Island (RM 1270): 2 plover nests (5 hatched) 11 plover chicks, 27 tern nests (1 hatched, 10 new, 1 abandoned) 1 tern chick
Total: 4 plover nests (5 hatched, 1 destroyed, 1 fate unknown) 11 plover chicks, 32 tern nests (13 new, 1 hatched, 11 destroyed, 3 fate unknown, 1 abandoned) 1 tern chick
Adult Census: 14 plovers and 64 terns (Partial - ND only)

Fort Randall Reach: The Missouri River below Fort Randall Dam was surveyed on July 3. No adults of either species were observed. Releases out of Fort Randall Dam are to be increased to 58,000 cfs this week.

Lewis & Clark Lake: Lewis & Clark Lake was surveyed on June 30. Six terns and one plover were seen for the adult census, but no nests were found on the lake. The mouth of the Niobrara was not surveyed this week. The results from last week are as follows: 11 plover nests, 26 tern nests
Adult Census: 32 Piping Plovers, 60 Least Terns (Lewis & Clark and Niobrara combined)

Gavins Point River Reach: The Missouri from RM 804.6 to RM 770.0 was surveyed on July 1 & 3. Sites at RM 804.5, 778.0, 775.0 and 770.0 were signed for the July 4th weekend. Releases out of Gavins Point Dam are to be increased to 62,000 cfs this week. Status is as follows:
RM 804.5 - 3 tern nests (2 unknown)
RM 804.4 - 1 plover nest
RM 801.0 - 1 plover nest & 2 tern nests (2 new)
RM 778.0 - 10 tern nests (1 hatched, 1 unknown) 2 tern chicks
RM 776.5 - 1 tern nest (1 hatched) 2 tern chicks
RM 776.0 - 0 tern nests (2 hatched)
RM 775.5 - 4 plover nests (4 new) 21 tern nests (2 hatched, 17 new) 2 tern chicks
RM 771.0 - 0 tern nests (1 destroyed)
RM 770.0 - 1 plover nest 7 tern nests (6 hatched, 1 destroyed) 3 tern chicks
RM 768.5 - 4 tern nests - not surveyed this week
RM 759.0 - 1 plover nest & 5 tern nests - not surveyed this week
Releases out of Gavins Point continue at 60,000 cfs.
Total: 8 plover nests (4 new) & 53 tern nests (19 new, 12 hatched 1 destroyed, 3 unknown) 9 tern chicks
Adult Census - 22 Piping Plovers 115 Least Terns

System Total: 26 plover nests (5 hatched, 4 new, 1 destroyed, 1 abandoned, 1 fate unknown), 12 plover chicks, 127 tern nests (12 hatched, 19 new, 12 destroyed, 1 abandoned, 3 fate unknown), 13 tern chicks

Special Notes:

1. As of July 4, 24 plovers and 10 terns have hatched out at the Gavins Point Project. 2 plover and 9 tern eggs continue to be incubated. 2 plover and 4 tern eggs were removed after it was determined the embryo was not viable.

2. Greg Pavelka was at the Fort Peck Project to observe T&E operations.

3. The adult census is complete except for the South Dakota portion of Lake Oahe. Storms kept the Oahe crew off the lake for most of the week.

Fort Peck Release Forecast

7/14	8,000
7/15	10,000
7/16	12,000
7/17-18	14,000
7/19-20	15,500
7/21-27	16,500
7/28-8/1	17,000

RM 1699.7
Tern chicks just hatched on July 3, should fledge by July 20
three plover eggs should have hatched by July 7, would fledge by August 5

RM 1690.2
four plover eggs due to hatch on July 21, would fledge by August 17

RM 1685.6
two tern eggs that should have hatched by July 4, would fledge by July 21
four plover eggs due to hatch on July 13, would fledge by August 9

RM 1677.0
three tern chicks due to fledge by July 12
two tern chicks due to fledge by July 15
three tern eggs that should have hatched by July 5, would fledge by July 22
three tern eggs due to hatch on July 15, would fledge by August 1
one tern egg (maybe more by now) due to hatch July 23, would fledge on August 9

RM 1674.6
two tern eggs should have hatched on July 4, would fledge by July 21
four plover eggs that should have hatched by July 7, would fledge by August 4

In addition to these monitored nests there were the following nests found during the adult census that was conducted on June 25 - 26.

RM 1725.8 - 2 tern nests
RM 1659.2 - 2 tern nests & 2 plover nests
RM 1643.0 - 2 tern nests
RM 1609.4 - 2 tern nests & 2 plover nests

Endangered Species Report

Missouri River Basin - System Summary - July 5 - July 11, 1997

Fort Peck Lake: Surveys completed for the season.
Adult Census: 0 plovers and 0 terns

Fort Peck River Reach: The Missouri River was surveyed on July 2 -3. The survey results for the past week are as follows:
RM 1699.7 - 0 tern nests (1 fate unknown)
RM 1690.2 - 1 plover nest
RM 1685.6 - 1 plover nest, 0 tern nests (1 hatched)
RM 1684.9 - 1 tern nest (1 new)
RM 1677.0 - 1 tern nest (1 hatched, 1 destroyed) 2 tern chicks
RM 1674.6 - 0 plover nests (1 hatched), 0 tern nests (1 hatched)
RM 1580.0 - 3 tern nests (3 new)
Releases out of Fort Peck Dam were raised to 8,000 cfs.
Total: 2 plover nests (1 hatched), 5 tern nests (1 hatched, 4 new, 1 fate unknown) 2 tern chicks
Adult Census: 23 plovers and 162 terns

Lake Sakakawea: The one plover chick at the Steinke Bay habitat area has fledged. Surveys of lake have been completed for the season.
Total: 1 fledged plover chick
Adult Census: 3 plovers and 0 terns

Garrison River Reach: The tern colony at Southport, RM 1314, continues to grow with 5 new tern nests found. Three live predator traps were installed by the USFWS at the colony site. Releases from Garrison Dam were increased to 59,000 cfs during the week.
Total: 15 tern nests (5 new)
Adult Census: 6 plovers and 41 terns

Lake Oahe: Two avian pole traps were set up the USDA trapper on Dredge Island on July 7. The survey results for the past week are as follows:
Mission (RM 1104): 1 tern nest
Little Bend (RM 1108-1109): 1 plover nest, 0 tern nests (1 hatched), 1 tern chick
RM 1115 - 2 tern nests (2 new)
RM 1150 - 1 tern nest (1 new)
Cheyenne River - 1 tern nest (1 new)
RM 1157 - 1 tern nest (1 new)
Swift Bird (RM 1158): 0 plover nests (1 fate unknown), 2 tern nests (3 new 1 destroyed)
Porcupine Island (RM 1249): 5 tern nests (2 new)

Dredge Island (RM 1270): 0 plover nests (2 hatched) 6 plover chicks(2 dead plover chicks recovered), 27 tern nests (11 hatched, 12 new, 1 abandoned) 14 tern chicks (2 dead tern chicks recovered)
Total: 1 plover nest (2 hatched, 1 fate unknown) 6 plover chicks, 40 tern nests (21 new, 12 hatched, 1 destroyed, 1 abandoned) 15 tern chicks
Adult Census: 14 plovers and 64 terns (ND)
17 plovers and 32 terns (SD - partial)

Fort Randall Reach: The Missouri River below Fort Randall Dam was surveyed on July 9. No adults of either species were observed. Surveys have been completed for the season.
Adult Census: 0 plovers and 0 terns

Lewis & Clark Lake: Lewis & Clark Lake was surveyed on June 30. Six terns and one plover were seen for the adult census, but no nests were found on the lake. The mouth of the Niobrara was surveyed on July 7. The results from last week are as follows:
6 plover nests (3 hatched, 2 fate unknown), 6 plover chicks, 1 tern nest (3 new, 22 hatched, 6 fate unknown, 1 abandoned) 13 tern chicks
Adult Census: 32 Piping Plovers, 60 Least Terns (Lewis & Clark and Niobrara combined)

Gavins Point River Reach: The Missouri was surveyed on July 8 - 10. One plover nest at RM 801 was destroyed by human disturbance. The U.S. Fish & Wildlife Service has been notified of the loss. Releases out of Gavins Point Dam were increased to 62,000 cfs on July 7. Status is as follows:
RM 804.5 - 1 tern nest (1 abandoned, 1 destroyed)
RM 804.4 - 0 plover nests (1 hatched) 2 plover chicks
RM 801.0 - 0 plover nests (1 hatched & 1 destroyed), 2 plover chicks & 0 tern nests (1 destroyed)
RM 778.0 - 2 plover nests, 16 tern nests (5 hatched, 2 new, 1 destroyed), 2 tern chicks
RM 776.5 - 1 tern nest, 2 tern chicks
RM 776.0 - 3 tern chicks
RM 775.5 - 1 plover nest, 10 tern nests (1 hatched, 1 destroyed), 4 tern chicks
RM 770.0 - 4 plover nests (1 new, 1 destroyed), 7 tern nests (2 hatched), 6 tern chicks
RM 768.5 - 0 tern nests (4 hatched), 2 tern chicks
RM 767.0 - 1 tern nest (1 new)
RM 759.0 - 2 plover nests (1 hatched, 2 new), 5 tern nests (4 hatched, 5 new, 1 destroyed), 5 tern chicks
Total: 9 plover nests (3 hatched, 3 new, 2 destroyed), 4 plover chicks, 41 tern nests (8 new, 16 hatched, 4 destroyed, 7 fate unknown, 3 abandoned) 24 tern chicks
Adult Census - 22 Piping Plovers 115 Least Terns

System Total: 18 plover nests (9 hatched, 3 new, 2 destroyed, 3 fate unknown), 16 plover chicks, 1 fledged plover chick, 102 tern nests (51 hatched, 41 new, 12 destroyed, 1 abandoned, 3 fate unknown), 54 tern chicks

Special Notes:

1. As of July 14, 26 plover and 16 tern chicks are being captively raised at the Gavins Point Project. The last two tern chicks hatched this week. One tern chick died during the week

2. On July 9 on the Missouri River at RM 791.5 Gavins Point personnel observed a banded least tern. The tern may be one of the captive reared birds that was released in 1995 or 1996.

Endangered Species Report

Missouri River Basin - System Summary - July 12 - July 18, 1997

Fort Peck River Reach: The Missouri River was surveyed on July 16-17. The survey results for the past week are as follows:
RM 1690.2 - 1 plover nest
RM 1685.6 - 0 plover nests (1 hatched)
RM 1684.9 - 1 tern nest
RM 1677.0 - 0 tern nests (1 hatched)
RM 1580.0 - 3 tern nests
Releases out of Fort Peck Dam were raised to 9,000 cfs on July 18.
Total: 1 plover nest (1 hatched), 4 tern nests (1 hatched)
Adult Census: 23 plovers and 162 terns

Lake Sakakawea
Adult Census: 3 Plovers, 0 Terns

Garrison River Reach: The tern colony at Southport, RM 1314 is the only site being surveyed on the river. Releases from Garrison Dam remained at 59,000 cfs during the week.
Total: 15 tern nests (1 new, 1 destroyed)
Adult Census: 6 plovers and 41 terns

Lake Oahe: Two Great Horned Owls were caught on the pole traps set up on Dredge Island. The survey results for the past week are as follows:
Mission (RM 1104): 4 fledged plovers, 1 tern nest (1 new, 1 fate unknown)
Pike Haven (RM 1106): 1 tern nest (1 new)
Little Bend (RM 1108-1109): 0 plover nests (1 hatched), 4 plover chicks
RM 1115 - 1 tern nest (1 abandoned)
RM 1150 - 1 tern nest
Cheyenne River - 1 tern nest
RM 1157 - 1 tern nest
Swift Bird (RM 1158): 2 tern nests
Porcupine Island (RM 1249): 5 tern nests (1 new, 1 destroyed)
Dredge Island (RM 1270): 10 plover chicks, 20 tern nests (4 new, 6 hatched, 2 destroyed, 2 fate unknown, 1 abandoned), 2 tern chicks
Total: 0 plover nests (1 hatched) 4 fledged plover juveniles, 14 plover chicks, 33 tern nests (7 new, 6 hatched, 3 destroyed, 3 fate unknown, 2 abandoned) 2 tern chicks
Adult Census: 31 plovers and 96 terns

Lewis & Clark Lake: The mouth of the Niobrara was surveyed on July 14. The flagged plover was again seen at his usual haunt along the north end of the survey area. The Niobrara is running

higher due to recent rain storms in the region. This has not had much of an effect as most nests have already hatched. Several of the terns should be fledging next week. The results from last week are as follows:
2 plover nests (2 hatched, 1 fate unknown, 1 status undetermined), 10 plover chicks, 3 tern nests (2 new) 19 tern chicks
Adult Census: 32 Piping Plovers, 60 Least Terns

Gavins Point River Reach: The Missouri was surveyed on July 15 - 17. Releases out of Gavins Point Dam remain at 62,000 cfs. Status is as follows:
RM 804.5 - 0 tern nests (1 hatched)
RM 801.0 - 1 plover chick
RM 778.0 - 2 plover nests, 9 tern nests (2 new, 4 hatched, 1 destroyed, 1 fate unknown, 3 abandoned), 11 tern chicks
RM 776.5 - 0 tern nests (1 hatched), 3 tern chicks
RM 776.0 - 3 tern chicks
RM 775.5 - 0 plover nests (1 destroyed), 3 tern nests (3 destroyed, 3 fate unknown, 1 abandoned), 0 tern chicks
RM 770.0 - 4 plover nests, 3 tern nests (1 new, 4 hatched, 1 abandoned), 9 tern chicks
RM 768.5 - 1 tern chick
RM 767.0 - 1 tern nest (1 new, 1 destroyed)
RM 759.0 - 1 plover nest (1 destroyed), 5 tern nests (2 new, 1 destroyed), 6 tern chicks
Total: 7 plover nests (2 destroyed), 1 plover chick, 21 tern nests (6 new, 9 hatched, 6 destroyed, 4 fate unknown, 5 abandoned) 33 tern chicks
Adult Census - 22 Piping Plovers 115 Least Terns

System Total: 10 plover nests (3 hatched, 2 destroyed, 2 fate unknown), 27 plover chicks, 4 fledged plover juveniles, 76 tern nests (16 new, 16 hatched, 10 destroyed, 7 abandoned, 7 fate unknown), 54 tern chicks

Special Notes:

1. As of July 18, 26 plover and 16 tern chicks are being captively raised at the Gavins Point Project. On July 17th 21 plover chicks were moved outside to the Flight Pen.

2. Preliminary adult census data shows 117 adult plovers and 474 adult terns on the Missouri for 1997. Last year's results were 182 adult plovers and 444 adult terns.

Endangered Species Report

Missouri River Basin - System Summary - July 19 - July 25, 1997

Fort Peck River Reach: The Missouri River was surveyed on July 22-23. The survey results for the past week are as follows:
RM 1690.2 - 0 plover nests (1 abandoned)
RM 1685.6 - 3 plover chicks, 2 fledged tern juveniles
RM 1684.9 - 1 tern nest
RM 1674.0 - 1 fledged tern juvenile
RM 1580.0 - 2 tern nests (1 destroyed)
Releases out of Fort Peck Dam were raised to 13,000 cfs on July 25.
Total: 0 plover nests (1 abandoned), 3 plover chicks, 4 tern nests (1 destroyed), 3 fledged tern juveniles

Garrison River Reach: The tern colony at Southport, RM 1314 is the only site being surveyed on the river. Releases from Garrison Dam remained at 59,000 cfs during the week.
Total: 6 tern nests (9 hatched), 8 tern chicks

Lake Oahe: The survey results for the past week are as follows:
Mission (RM 1104): 1 tern nest, 2 tern chicks
Pike Haven (RM 1106): 1 tern nest
Little Bend (RM 1108-1109): 4 plover chicks, 2 tern chicks, 3 fledged tern juveniles
RM 1115 - 0 tern nests (1 fate unknown)
RM 1150 - 1 tern nest
Cheyenne River - 1 tern nest
RM 1157 - 0 tern nests (1 destroyed)
Swift Bird (RM 1158): 2 tern nests
Porcupine Island (RM 1249): 1 tern nest (4 hatched), 9 tern chicks
Dredge Island (RM 1270): 2 fledged plover juveniles, 11 tern nests (3 hatched, 2 destroyed, 3 fate unknown, 1 abandoned), 3 tern chicks
Total: 2 fledged plover juveniles, 4 plover chicks, 18 tern nests (7 hatched, 3 destroyed, 4 fate unknown, 1 abandoned) 16 tern chicks, 3 fledged tern juveniles

Lewis & Clark Lake: The mouth of the Niobrara was surveyed on July 21. The flagged plover was again seen at his usual haunt along the north end of the survey area. The Niobrara was running much lower this week. Due to the large area covered and increased vegetation it is becoming more difficult to see the chicks. Several fledged birds of both species were seen. The results from last week are as follows:
0 plover nests (2 hatched), 8 plover chicks, 4 fledged plover juveniles, 2 tern nests (1 hatched) 3 tern chicks, & 13 fledged tern juveniles.

Gavins Point River Reach: The Missouri was surveyed on July 22 - 24. Releases out of Gavins Point Dam were accidentally raised to 64,500 cfs from July 19 - 21. Releases were reduced to 62,000 cfs on the 21st. Two tern nests were lost to flooding. Status is as follows:
RM 801.0 - 0 plover chicks, 1 tern nest (1 new)
RM 778.0 - 2 plover nests, 8 tern nests (2 new, 2 hatched, 1 fate unknown), 17 tern chicks
RM 776.5 - 3 fledged tern juveniles
RM 776.0 - 0 tern chicks - all lost to predation
RM 775.5 - 1 tern nest (1 new, 1 hatched, 2 destroyed), 0 tern chicks
RM 770.0 - 4 plover nests, 1 tern nest (1 new, 2 hatched, 1 destroyed), 5 tern chicks
RM 768.5 - 1 fledged tern juvenile
RM 767.0 - 0 tern nests (1 destroyed)
RM 759.0 - 1 plover nest, 5 tern nests (1 new, 1 hatched), 2 tern chicks, 6 fledged tern juveniles
Total: 7 plover nests, 16 tern nests (6 new, 6 hatched, 4 destroyed, 1 fate unknown) 24 tern chicks, 10 fledged tern juveniles

System Total: 7 plover nests (2 hatched, 1 abandoned), 15 plover chicks, 6 fledged plover juveniles, 48 tern nests (6 new, 23 hatched, 8 destroyed, 5 fate unknown, 1 abandoned), 51 tern chicks, 29 fledged tern juveniles

Special Notes:

1. On July 26, 16 plovers were transported to, and released at, the Beduoin National Wildlife Refuge. The refuge is located near Malta, Montana. Two plover chicks died during the week. This leaves 8 plover and 16 tern chicks still being captively raised at the Gavins Point Project.

2. Biologists for the Nebraska Game & Parks Commission reported the flagged plover and mate at the sandpit near Valley NE successfully fledged three plover juveniles on July 16.

3. Anita Cramm of the Lincoln Park Zoo reported that only one of the plover eggs laid by the zoo plovers was fertile and this one did not hatch.

4. The final adult census data has come in. The totals are 117 adult plovers and 479 adult terns on the Missouri for 1997. Last year's results were 182 adult plovers and 444 adult terns.

Endangered Species Report

Missouri River Basin - System Summary - July 26 - August 1, 1997

Fort Peck River Reach: The Missouri River was surveyed on July 29-30. The survey results for the past week are as follows:
RM 1690.2 - 0 plover nests (1 abandoned)
RM 1685.6 - 3 plover chicks, 2 fledged tern juveniles
RM 1684.9 - 1 tern nest
RM 1674.0 - 1 fledged tern juvenile
RM 1580.0 - 1 tern nest (1 hatched), 2 tern chicks
RM 1564.5 - 8 tern nests (8 new)
Releases out of Fort Peck Dam were raised to 15,000 cfs during the week.
Total: 0 plover nests (1 abandoned), 3 plover chicks, 10 tern nests (8 new, 1 hatched), 2 tern chicks, 3 fledged tern juveniles

Garrison River Reach: The tern colony at Southport, RM 1314 is the only site being surveyed on the river. Three dead tern chicks were collected from the colony site. Releases from Garrison Dam were reduced to 51,500 cfs during the week.
Total: 1 tern nest (1 new, 6 hatched), 6 tern chicks

Lake Oahe: The Bismarck Office reported the capture of a third Great Horned Owl on Dredge Island and that the second trap had been sprung. They also found a lot of tern feathers scattered around the island indicating heavy predation. The survey results for the past week are as follows:
Mission (RM 1104): 0 tern nests (1 hatched), 2 tern chicks
Pike Haven (RM 1106): 0 tern nests (1 abandoned)
Little Bend (RM 1108-1109): 4 plover chicks
RM 1150 - 0 tern nests (1 abandoned)
Cheyenne River - 0 tern nests (1 fate unknown)
Swift Bird (RM 1158): 1 tern nest (1 destroyed)
Porcupine Island (RM 1249): 0 tern nests (1 hatched), 6 tern chicks
Dredge Island (RM 1270): 7 fledged plover juveniles, 1 tern nest (7 hatched, 2 nonviable eggs, 3 fate unknown), 1 tern chick, 2 fledged tern juveniles
Total: 7 fledged plover juveniles, 4 plover chicks, 2 tern nests (9 hatched, 1 destroyed, 5 fate unknown, 2 abandoned 2 nonviable) 3 tern chicks, 2 fledged tern juveniles

Lewis & Clark Lake: The mouth of the Niobrara was surveyed on July 28. The flagged plover was not seen this week. The results from last week are as follows:
3 plover chicks, 6 fledged plover juveniles, 1 tern nest (1 hatched) 1 tern chick, & 23 fledged tern juveniles.

Gavins Point River Reach: The Missouri was surveyed on July 29 - August 1. Releases out of Gavins Point Dam remain at 62,000 cfs. Status is as follows:
RM 801.0 - 1 tern nest
RM 778.0 - 1 plover nest (1 destroyed), 4 tern nests (2 hatched, 1 abandoned, 1 destroyed), 10 tern chicks, 3 fledged tern juveniles
RM 775.5 - 1 tern nest
RM 770.0 - 3 plover nests (1 fate unknown), 1 tern nest, 3 tern chicks, 8 fledged juveniles
RM 768.5 - 4 fledged tern juveniles
RM 759.0 - 0 plover nests (1 hatched), 1 plover chick, 0 tern nests (3 hatched 2 destroyed), 2 tern chicks
Total: 4 plover nests(1 hatched, 1 destroyed, 1 fate unknown), 1 plover chick, 8 tern nests (5 hatched, 2 destroyed, 1 abandoned) 15 tern chicks, 15 fledged tern juveniles

System Total: 4 plover nests (1 hatched, 1 destroyed, 1 abandoned), 11 plover chicks, 13 fledged plover juveniles, 22 tern nests (9 new, 21 hatched, 3 destroyed, 5 fate unknown, 3 abandoned, 2 nonviable), 21 tern chicks, 28 fledged tern juveniles

Special Notes:

1. On July 28, 3 captive reared plovers were transported to, and released at, the mouth of the Niobrara River north of the Highway 12 bridge. This leaves 5 plover and 16 tern juveniles being captively raised at the Gavins Point Project. The sixteen tern juveniles have shown marked improvement in their fishing skills at the flight pen over the past week.

Endangered Species Report

Missouri River Basin - System Summary - August 4 - 9, 1997

Fort Peck River Reach: The Missouri River was surveyed on August 4 & 5. The survey results for the past week are as follows:
RM 1685.6 - 4 plover chicks, 2 fledged tern juveniles
RM 1684.9 - 0 tern nests (1 destroyed)
RM 1677.0 - 4 fledged tern juveniles
RM 1580.0 - 0 tern nests (1 fate unknown), 1 tern chick
Releases out of Fort Peck Dam were raised to 17,000 cfs during the week.
Total: 4 plover chicks, 0 tern nests (1 destroyed, 1 fate unknown), 1 tern chick, 6 fledged tern juveniles

Lake Sakakawea: A check of boundaries showed that the tern colony at RM 1564.5 previously reported on the Fort Peck River Reach is actually within Lake Sakakawea and will be reported as such. The survey results for the past week are as follows:
RM 1564.5 - 2 tern nests (4 hatched, 2 fate unknown), 5 tern chicks

Garrison River Reach: The tern colony site at Southport, RM 1314, is the only site being surveyed on the river. A fox is believed to have destroyed the last tern nest. Releases from Garrison Dam were reduced to 50,000 cfs during the week. The survey results for the past week are as follows:
Total: 0 tern nest (1 destroyed), 3 fledged tern juveniles

Lake Oahe: The Bismarck Office reported the capture of a two more Great Horned Owls on Dredge Island. Porcupine Island was washed over during the week and no tern chicks were found when the island was surveyed. Mission, Little Bend, and Swift Bird were not surveyed last week due to inclement weather. This week's results for these three areas are a repetition of last week's results. The survey results for the past week are as follows:
Mission (RM 1104): 2 tern chicks
Little Bend (RM 1108-1109): 4 plover chicks
Swift Bird (RM 1158): 1 tern nest
Porcupine Island (RM 1249): 0 tern chicks
Dredge Island (RM 1270): 0 fledged plover juveniles, 0 tern nests (1 destroyed), 1 tern chick, 0 fledged tern juveniles
Total: 0 fledged plover juveniles, 4 plover chicks, 1 tern nest (1 destroyed) 3 tern chicks, 0 fledged tern juveniles

Lewis & Clark Lake: The mouth of the Niobrara was surveyed on August 4. One of the released plover juveniles was seen during the survey. The results from last week are as follows: 5 fledged plover juveniles, 0 tern nests (1 hatched), and 10 fledged tern juveniles.

Gavins Point River Reach: The Missouri was surveyed on August 5 - 7. Releases out of Gavins Point Dam were increased to 63,500 cfs on August 5 and 65,000 cfs on August 8. Status is as follows:
RM 801.0 - 0 tern nests (1 fate unknown)
RM 778.0 - 1 plover nest, 2 tern nests (1 hatched, 1 destroyed), 1 tern chick, 10 fledged tern juveniles
RM 775.5 - 1 tern nest
RM 770.0 - 0 plover nests (3 hatched), 4 plover chicks, 1 tern nest, 3 tern chicks, 8 fledged juveniles
RM 759.0 - 2 tern chicks
Total: 1 plover nest (3 hatched), 4 plover chicks, 4 tern nests (1 hatched, 1 destroyed, 1 fate unknown) 6 tern chicks, 18 fledged tern juveniles

System Total: 1 plover nest (3 hatched), 12 plover chicks, 5 fledged plover juveniles, 7 tern nests (6 hatched, 4 destroyed, 4 fate unknown), 15 tern chicks, 37 fledged tern juveniles

Special Notes:

1. On August 7, five captive reared plovers were transported to, and released at, the mouth of the Niobrara River north of the Highway 12 bridge. This leaves sixteen tern juveniles being captively raised at the Gavins Point Project.

2. Lou Hanebury, Bowdoin NWR MT, reported three of the sixteen plovers released on the refuge on July 26 are still on site. He believes the other thirteen have migrated from the refuge.

Endangered Species Report

Missouri River Basin - System Summary - August 11 - 16, 1997

Fort Peck River Reach: The Missouri River was surveyed on August 11 & 14. The survey results for the past week are as follows:
RM 1685.6 - 4 fledged plover juveniles
RM 1580.0 - 1 tern chick
Releases out of Fort Peck Dam remained at 17,000 cfs during the week.
Total: 4 fledged plover juveniles, 1 tern chick

Lake Sakakawea: The survey result for the past week is as follows:
RM 1564.5 - 0 tern nests (2 destroyed), 5 tern chicks

Garrison River Reach: The tern colony site at Southport, RM 1314, is the only site being surveyed on the river. Releases from Garrison Dam remained at 50,000 cfs during the week. The survey results for the past week are as follows:
Total: 3 fledged tern juveniles

Lake Oahe: The pole traps were removed from Dredge Island. The survey results for the past week are as follows:
Swift Bird (RM 1158): 0 tern nests (1 fate unknown)
Dredge Island (RM 1270): 3 fledged plover juveniles, 1 fledged tern juvenile
Total: 3 fledged plover juveniles, 0 tern nests (1 fate unknown) 1 fledged tern juvenile

Lewis & Clark Lake: The mouth of the Niobrara was surveyed on August 11. One of the released plover juveniles was seen during a GPS exercise on August 13. The results from last week are as follows:
4 fledged plover juveniles

Gavins Point River Reach: The Missouri was surveyed on August 12. Releases out of Gavins Point Dam continue at 65,000 cfs. Status is as follows:
RM 778.0 - 0 plover nests (1 abandoned), 0 tern nests (1 fate unknown, 1 destroyed), 5 fledged tern juveniles
RM 775.5 - 0 tern nests (1 destroyed)
RM 770.0 - 0 tern nests (1 hatched), 3 fledged juveniles
RM 759.0 - 2 fledged juveniles
Total: 0 plover nests (1 abandoned), 0 plover chicks, 0 tern nests (1 hatched, 2 destroyed, 1 fate unknown) 0 tern chicks, 10 fledged tern juveniles

System Total: 0 plover nests (1 abandoned), 11 fledged plover juveniles, 0 tern nests (1 hatched, 4 destroyed, 2 fate unknown), 6 tern chicks, 14 fledged tern juveniles

Special Notes:

1. On August 11 sixteen captive reared terns were transported to, and released at, the mouth of the Niobrara River north of the Highway 12 bridge. This completes the captive rearing at Gavins Point for 1997.

APPENDIX F

PUBLIC AWARENESS

Date

Programming Director
Omaha radio station
address

Dear (name):

The Corps of Engineers has produced a short (30 second) Public Service Announcement (PSA) for radio use this summer, especially around the July 4 holiday. The PSA was read by Girl Scout Troop 503, fifth grade girls from Our Lady of Lourdes grade school here in Omaha. Several of the girls are working on an endangered species badge and this was something extra to go towards the badge.

The subject of the PSA focuses on avoidance of sandbar islands because these islands are used for nesting and chick-rearing by the least tern (endangered species) and the piping plover (threatened species). A copy of the script is attached.

The PSA's were produced as part of the Corps' implementation of the Biological Opinion issued by the U.S. Fish and Wildlife Service to the Corps. In it, the Corps is requested to increase public awareness of these birds, as well as develop additional habitat and to monitor their populations within the Missouri River basin.

Please let us know (see enclosed form) if you are able to air the enclosed PSA this summer. This same PSA will be used for several summers.

Thank you for your assistance on increasing public awareness of the plight of the least tern and piping plover.

Sincerely,

2 Encls. (script and use form)

KTFC
RT 2, BOX 102-A
SIOUX CITY IA 51106

KSOO (AM)/KPAT (FM)
2600 SPRING AVE
SIOUX FALLS SD 57105

KELO AM-FM
500 S PHILLIPS ST
SIOUX FALLS SD

KWSL (AM)/KGLI (FM)
BOX 1737
SIOUX CITY IA 51102

KMNS(AM)/KSEZ (FM)
901 STEUBEN ST
SIOUX CITY, IA 51102

KXRB(AM)/KKLS(
3205 S MEADOW S
SIOUX FALLS SD

WNAX (AM-FM)
1609 E HWY 50
YANKTON SD 57078

KUSD AM-FM
414 E CLARK ST
VERMILLION SD 57069

KNEN (FM)
BOX 937
NORFOLK NE 687(

WJAG (AM)
BOX 789
NORFOLK NE 68701

KQDY (FM)/KBMR (AM)
3500 E ROSSER AVE
BISMARCK ND 58501

KCND (FM)
1814 N 14 ST
BISMARCK ND 58

KFYR (AM)
BOX 1738
BISMARCK ND 58502

The following scripted Public Service Announcement (PSA) was sent to the above radio station

If your plans include boating on the Missouri River or on the U.S. Army Corps of Engineers lakes on the Fourth of July weekend, the Corps reminds you that many sandbars provide nesting habitat for the interior least tern and piping plover, both of which are protected under the Endangered Species Act. The Corps and the U.S. Fish and Wildlife Service monitor these birds and post the larger nesting islands. Please do your part to help by avoiding islands colonized b the tern and plover. (reading time 30 seconds)

PUBLIC SERVICE DIRECTOR
KFAB
5010 UNDERWOOD
OMAHA NE 68132

PUBLIC SERVICE DIRECTOR
KQKQ
1001 FARNAM ST
OMAHA NE 68102

PUBLIC SERVICE DIRECTOR
KFOR
PO BOX 80209
LINCOLN NE 68501

PUBLIC SERVICE DIRECTOR
WJAG
PO BOX 789
NORFOLK NE 68701

PUBLIC SERVICE DIRECTOR
KOTD
808 BEACON DR
PO BOX 509
PLATTSMOUTH NE 68048

PUBLIC SERVICE DIRECTOR
KKAR
1001 FARNAM ST
OMAHA NE 68102

PUBLIC SERVICE DIRECTOR
KEZO
11128 JOHN GALT BLVD
OMAHA NE 68137

PUBLIC SERVICE DIRECTOR
KLIN
PO BOX 30181
4343 O ST
LINCOLN NE 68503

PUBLIC SERVICE DIRECTOR
KNEN
300 MADISON AVE
NORFOLK NE 68701

PUBLIC SERVICE DIRECTOR
KWPN
1011 N LINCOLN
PO BOX 84
WEST POINT NE 68788

PUBLIC SERVICE DIRECTOI
KESY
4807 DODGE ST
OMAHA NE 68132

PUBLIC SERVICE DIRECTOI
WOW
5030 N 72 ST
OMAHA NE 68134

PUBLIC SERVICE DIRECTOI
KTCH
PO BOX 413
W. HWY 35
WAYNE NE 68787

PUBLIC SERVICE DIRECTOI
KBRX
PO BOX 150
O'NEILL NE 68763

The above radio stations received a taped PSA that was recorded by a Girl Scout Troop from Our Lady of Lourdes Grade School in Omaha, Nebraska. The stations were requested to play the tape throughout the summer, but especially over the fourth of July holiday. The script for the pre-taped PSA is as follows:

Are you spending the weekend on the Platte River or the upper Missouri River? Many river sandbars provide nesting and chick-rearing habitat for endangered bird species. The least tern is an endangered bird. The piping plover is a threatened bird. Both of these birds and their chicks need our help to survive. Several sandbar islands have signs on them asking people to stay off because terns and plovers nest there. Girl Scout Troop 503 and the Corps of Engineers asks you to avoid these nesting areas and help protect our natural heritage.

(recorded time approximately 30 seconds)

PUBLIC SERVICE DIRECTOR
KBMY-TV
919 S 7TH ST
PO BOX 7277
BISMARCK ND 58507

PUBLIC SERVICE DIRECTOR
KXMD-TV
PO BOX 790
WILLISTON ND 58801

PUBLIC SERVICE DIRECTOR
KSFY-TV
300 N DAKOTA STE 100
SIOUX FALLS SD 57102

PUBLIC SERVICE DIRECTOR
KCAU-TV
7TH AND DOUGLAS ST
SIOUX CITY IA 51101

PUBLIC SERVICE DIRECTOR
KXNE-TV
BOX 83111
NORFOLK NE 68501

PUBLIC SERVICE DIRECTOR
KFYR-TV
200 N 4TH ST
PO BOX 1738
BISMARCK ND 58502

PUBLIC SERVICE DIRECTOR
KUMV-TV
602 MAIN ST
BOX 1287
WILLISTON ND 58801

PUBLIC SERVICE DIRECTOR
KUSD-TV
CHERRY AND DAKOTA STS
PO BOX 5000
VERMILLION SD 57069

PUBLIC SERVICE DIRECTOR
KMEG-TV
PO BOX 657
SIOUX CITY IA 51102

PUBLIC SERVICE DIRE
KXMB-TV
1811 N 15 ST
PO BOX 1617
BISMARCK ND 58502

PUBLIC SERVICE DIRE
KELO-TV
501 S PHILLIPS
SIOUX FALLS SD 57102

PUBLIC SERVICE DIRE
KTIV-TV
3135 FLOYD BLVD
SIOUX CITY IA 51105

PUBLIC SERVICE DIRE
KOLN-TV
BOX 30350
LINCOLN NE 68503

The above television stations received a video PSA (20-seconds) on the protection of sandba nesting habitat for the interior least tern and piping plover for broadcast throughout the sumn but especially over the fourth of July holiday.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
420 South Garfield Avenue, Suite 400
Pierre, South Dakota 57501-5408

October 4, 1996

Dear Tern and Plover Management Team:

Enclosed is the agenda for the Tern and Plover Management Team meeting which is scheduled for October 22-23, 1996, at the Sheraton, 27 North 27th Street, Billings, Montana (Telephone 1-800-588-7666). Arnie Dood of the Montana Department of Fish, Wildlife and Parks is our host for the meeting. If you have any questions about meeting accommodations, please call Arnie at (406) 994-6433.

Remember those giving State reports should provide a written summary at the meeting. Presenting a written report will help use our time wisely and will help with note keeping. As you can see from the agenda, the Corps of Engineers will be providing a summary of Missouri River information.

Again, I would also like Tern and Plover Management Team members to be prepared to provide specific recommendations for least tern and piping plover management efforts for 1997. Please give some considerable thought to potential habitat projects. It would help if you brought lists of items or something to simplify discussion when we consider Annual Operating Plan comments for the Corps of Engineers. The Tern and Plover Management Team can supply least tern and piping plover management recommendations in addition to flow recommendations to the Corps of Engineers for consideration on the Annual Operating Plan.

As for the facilitated discussion on Missouri River salvage/captive rearing efforts, I hope to come away from the meeting with the Tern and Plover Management Team's best biological recommendations on the issue. I believe that the Corps of Engineers would benefit from the Tern and Plover Management Team's collective expertise on this effort.

If you have any questions concerning this upcoming meeting, please call me at (605) 224-8693, Extension 32, or E-mail at R6FWE_PIE@fws.gov.

Sincerely,

Nell McPhillips

Nell McPhillips, Chair
Tern and Plover Management Team

AGENDA
TERN AND PLOVER MANAGEMENT TEAM MEETING
OCTOBER 22-23, 1996
BILLINGS, MONTANA

Tuesday, October 22, 1996

8:00 - 8:30	Introductions and Challenge: Where has the Tern and Plover Management Team been and where are we headed? (N. McPhillips)
8:30 - 9:00	Corps of Engineers' briefing on the proposed 1997 Annual Operating Plan. (D. Wooster or D. Latka)
9:00 - 9:45	Corps of Engineers' briefing on 1996 least tern and piping plover management efforts and the proposal for 1997. (C. Kruse)
9:45 - 10:00	Break
10:00 - 11:00	State reports for 1996 least tern and piping plover nesting season.
11:00 - 12:00	Natural river hydrography on the Yellowstone River and its effects on least tern population densities. (L. Bacon)
1:30 - 2:00	Briefing from the Missouri River Natural Resource Committee on the Missouri River monitoring proposal.
2:00 - ?	Discussions on Annual Operating Plan recommendations and State recommendations to the Corps of Engineers for 1997 least tern and piping plover management.

Wednesday, October 23, 1996

8:00 - 12:00	Facilitated discussion on least tern and piping plover captive rearing efforts during flood operations.
	Complete Annual Operating Plan recommendations.
1:00 - ?	Other topics.

CEnwo

United States Army Corps of Engineers
Omaha District

Environmental Analysis Branch

Planning Division

ENVIRONMENTAL SLIDE SHOW

Tern and Plover Habitat Studies

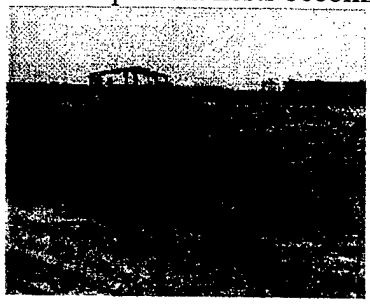
The Omaha District is actively working to protects our nations threatened endangered species from further loss of habitat. These pictures illustrate our work at Lewis and Clark Lake with the South Dakota National Guard to protect Least Terns and Piping Plovers

1. The interior population of the least tern is federally listed as "endangered." In our area, the terns nest on barren sandbar islands during the summer. These terns share a fish while incubating a nest of eggs.

2. The piping plover is federally listed as "threatened." Plovers also nest on sandbar islands, but also use reservoir shorelines, prairie potholes, and gravel pits as nesting habitat.

3. One facet of our habitat studies included protection of nesting areas from erosion resulting from variation in river levels and channel location. This aerial photo shows erosion protection on the

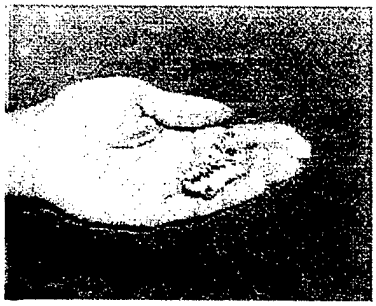
4. Another facet of habitat protection involves raising low elevation habitat to higher elevations in order to prevent nests becoming flooded due to fluctuations in river elevation.



5. Heavy equipment is mobilized to the islands using the floating bridges of the South Dakota Army National Guard.

6. Habitat work, in combination with predator control and public awareness, result in success, such as this least tern nest and chick.

7. Monitoring nest success and chick survival assist us in our efforts for the future of this piping plover chick and other hatchlings.



8. Our studies have resulted in terns and plovers becoming a part of the Corps' ongoing operation and maintenance for the Missouri River main stem dams.

for more information on the program, please contact Becky Latka

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For more information on this homepage, contact Ed Brodnicki at edward.c.brodnicki@usace.army.mil
phone number (402)221-4888
Last updated on April 9. 1996

CEMRO-OP-TN

MEMORANDUM FOR DISTRIBUTION

SUBJECT: Threatened & Endangered Species Field and Water Safety Training

1. Field training for **permanent project personnel** who work in the T&ES program is described below:

a. The training will take place at the Comfort Inn Suites in Bismarck ND on April 29 & 30.
b. The training on April 29 will run from 0830 hours to 1730 hours and on April 30 from 0830 hours to 1200 hours.
c. A block of rooms have been reserved at the Comfort Inn Suites from April 28 to April 30. The room rate is $35.00 per night. Rooms must be reserved by April 14. The phone number for the Comfort Inn Suites is 701-223-4009.

2. Field training for **summer hires, coops, and stay-in-schools** who work in the T&E program is described below:

a. The training will take place at the Garrison Project Office conference room in Riverdale ND on June 2 & 3.
b. The training on June 2 will run from 0830 hours to 1730 hours and on June 3 from 0830 hours to 1200 hours.
c. Reservations may be made at any of the following motels:

1. Sakakawea Motel in Pick City ND 701-487-3356 (3 miles from Riverdale).
2. Scotwood Motel in Washburn ND 701-462-8191 (30 miles from Riverdale).
3. Garrison Motel in Garrison ND 701-463-2858 (25 miles from Riverdale).
4. Roughrider Motor Inn Hazen ND 701-748-2209 (25 miles from Riverdale).

3. All personnel or their project offices are responsible for making their own motel reservations. All reservations should be made as soon as possible.

4. **Important Note: All personnel taking the T&E field training, described in number 2 above, must also take Water Safety Training. This training will begin at 1300 hours on June 3, immediately follow the T&E training, and run through Friday June 6. More information on this training will be coming shortly.**

5. POC is John F. Kirwan, (402) 221-4686, or Greg Pavelka, (402) 667-7873.

John F. Kirwan
Wildlife Biologist
Omaha District

CEMRO-OP-TN (Gen 420-74j)
SUBJECT: T&ES Field and Water Safety Training

DISTRIBUTION:
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CEMRO-OP-OA-MOBRIDGE
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CEMRO-OP-FR
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Kirwan/4686

THREATENED AND ENDANGERED SPECIES PROGRAM - OMAHA DISTRICT

1997 PIPING PLOVER AND LEAST TERN
CENSUS AND PRODUCTIVITY MONITORING TECHNIQUES

LOCATION:
Comfort Inn Suites
Bismarck, ND

DATE:
April 29-30, 1997

Casey D. Kruse and Gregory A. Pavelka
Omaha District Endangered Species Coordinators

Tuesday, April 29

8:30-9:00 Welcome & Introductions
9:00-9:30 Review of the 1996 Field Season
9:30-9:45 Results of the 1996 International Piping Plover Census
9:45-10:00 Break
10:00-10:30 Endangered Species Permit Review
10:30-11:00 Captive Rearing Program
11:00-12:00 "A Vanishing Melody"

12:00-1:00 Lunch

1:00-2:30 Census and Monitoring Methods Refresher and Practical
2:30-2:45 Break
2:45-3:15 Nest Cards
3:15-4:00 Weekly & Annual Reports
4:00-4:15 Break
4:15-4:45 The Internet & Groupwise
4:45-5:00 Special Study - The Niobrara

Wednesday, April 30

8:00-8:30 T&E Program 1997 - What to Expect.
8:30-9:30 Least Tern/Piping Plover Recovery & Conservation Plan
9:30-9:45 Break
9:45-10:00 Review of Test
10:00-12:00 Field Practical
12:00-12:30 Wrap-up

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
420 South Garfield Avenue, Suite 400
Pierre, South Dakota 57501-5408

October 4, 1996

Dear Tern and Plover Management Team:

Enclosed is the agenda for the Tern and Plover Management Team meeting which is scheduled for October 22-23, 1996, at the Sheraton, 27 North 27th Street, Billings, Montana (Telephone 1-800-588-7666). Arnie Dood of the Montana Department of Fish, Wildlife and Parks is our host for the meeting. If you have any questions about meeting accommodations, please call Arnie at (406) 994-6433.

Remember those giving State reports should provide a written summary at the meeting. Presenting a written report will help use our time wisely and will help with note keeping. As you can see from the agenda, the Corps of Engineers will be providing a summary of Missouri River information.

Again, I would also like Tern and Plover Management Team members to be prepared to provide specific recommendations for least tern and piping plover management efforts for 1997. Please give some considerable thought to potential habitat projects. It would help if you brought lists of items or something to simplify discussion when we consider Annual Operating Plan comments for the Corps of Engineers. The Tern and Plover Management Team can supply least tern and piping plover management recommendations in addition to flow recommendations to the Corps of Engineers for consideration on the Annual Operating Plan.

As for the facilitated discussion on Missouri River salvage/captive rearing efforts, I hope to come away from the meeting with the Tern and Plover Management Team's best biological recommendations on the issue. I believe that the Corps of Engineers would benefit from the Tern and Plover Management Team's collective expertise on this effort.

If you have any questions concerning this upcoming meeting, please call me at (605) 224-8693, Extension 32, or E-mail at R6FWE_PIE@fws.gov.

Sincerely,

Nell McPhillips

Nell McPhillips, Chair
Tern and Plover Management Team

AGENDA
TERN AND PLOVER MANAGEMENT TEAM MEETING
OCTOBER 22-23, 1996
BILLINGS, MONTANA

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APPENDIX G

CHICK REARING

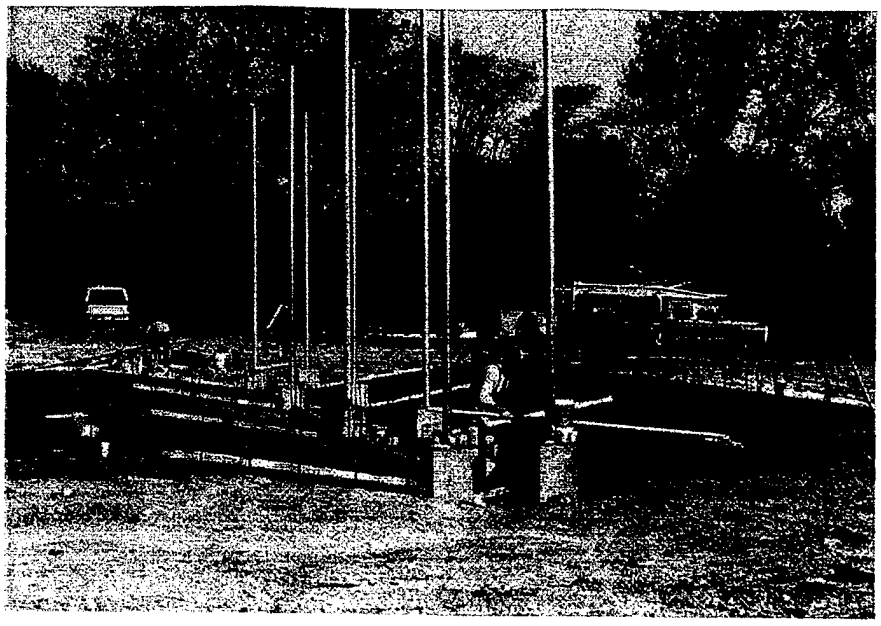


Photo 1.

Construction of the flight pen at the Gavins Point Dam chick-rearing facility during 1997.

Photo 2.

Captive - raised least terns in completed flight pen. Note gently sloping pond in foreground. The pond is stocked with antibiotic-injected minnows for use as forage.

Photo 3.

Captive - raised piping plover in flight pen. Driftwood and a sand-and-gravel mixture provide a "natural" setting.

Photo 4.

Birds are banded prior to release.

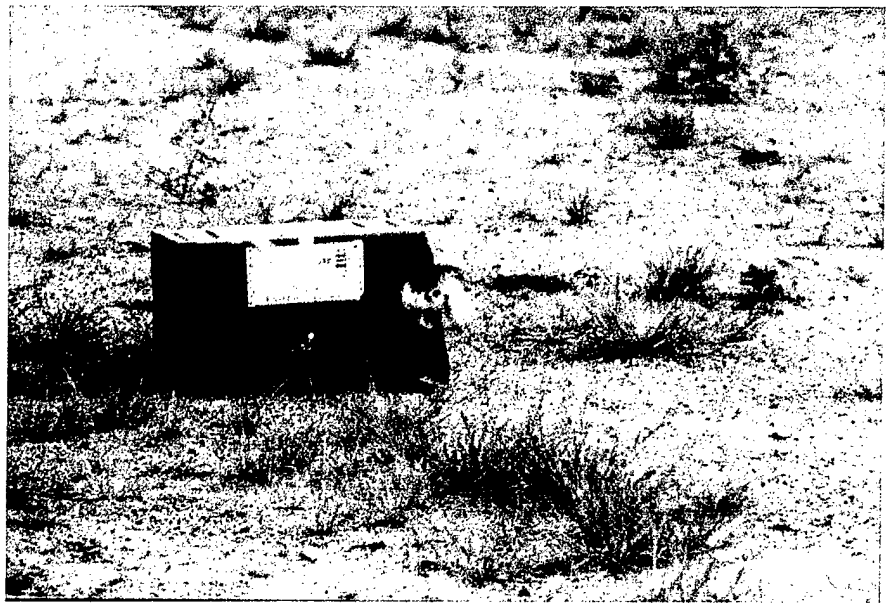


Photo 5.

Captive - raised piping plover is released into the wild.

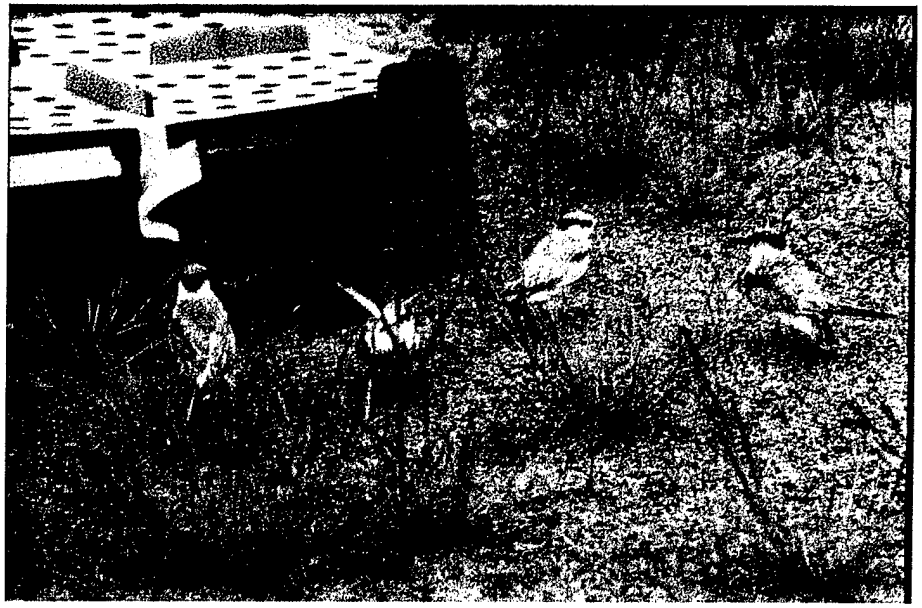


Photo 6.

Captive - raised least terns are released into the wild.

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, MISSOURI RIVER DIVISION
12565 WEST CENTER ROAD
OMAHA, NEBRASKA 68144-3869

REPLY TO
ATTENTION OF

30 APR 1997

CEMRD-ET-R

MEMORANDUM FOR Commander, Omaha District

SUBJECT: Forecast 1997 Water Levels and Collection of Threatened and Endangered (T&E) Nests for Captive Propagation

1. The Missouri River main stem reservoir system has experienced runoff the first three months of this year which was 290 percent of normal. Despite record system releases, the system's flood pool is 58 percent filled and the unmelted mountain snowpack is at 138 percent of normal. This year's CY97 annual runoff is predicted to be 38.5 million acre-feet (MAF) compared to the 24.6 MAF average. For the third year in a row, a greater than upper decile runoff year is occurring. Our latest forecast is for near full power plant releases or greater at all projects except Big Bend for most of the least tern and piping plover (tern and plover) nesting season. These high flows afford very little chance for natural tern and plover reproduction. Last year with above normal system release levels, Gavins Point and Fort Randall releases were reduced several times to limit downstream flooding. The birds took advantage of temporary lowered stages at traditional sites and nested. This year short term cutbacks in releases are also a possibility.

2. It is our understanding the Omaha District has applied for and received a subpermit from the U.S. Fish and Wildlife Service (Service) which allows the Corps to collect eggs and captively propagate terns and plovers if flood conditions occur. We also understand that before the permit is utilized the District's tern and plover release monitoring plan must be approved by the Service. At the 15 April 1997 meeting at the Missouri River Regional office, Omaha District staff presented a tern and plover egg collection plan for 1997. The plan centered on limiting the collection to 50 chicks or eggs of each species before June 15th for captive rearing.

3. Under the current circumstance, there is no requirement to collect and propagate terns and plovers in the riverine reaches under the Biological Opinion. Further, the Biological opinion does not include any protection to terns and plovers on reservoir/lake areas at our projects. Under Section 7(a)(1) of the ESA, however, the Corps does have the discretion to undertake conservation efforts otherwise within our authority. The Omaha District's plan to limit the collection to 50 chicks and/or eggs of each species is not consistent with our past conservation efforts. Therefore, similar to last year's effort, the District should take all reasonable measures to propagate eggs in immediate danger of inundation this nesting season. Because reservoir levels are now significantly higher than they were at this time last year, however, it may be necessary to curtail or terminate these conservation efforts on short notice. If you have any questions, you

CEMRD-OC
SUBJECT: Forecast 1997 Water Levels and Collection of Threatened and Endangered (T&E) Nests for Captive Propagation

may contact Dave Wooster (697-2633) or Doug Latka (697-2477). The Reservoir Control Center will continue to keep you updated on current river and reservoir conditions.

RICHARD W. CRAIG
COL EN
Commanding

APPENDIX A

CONTINGENCY PLAN FOR PROTECTION OF LEAST TERN AND PIPING PLOVER NESTS AND CHICKS

The Corps of Engineers will carry out the following contingency plan for the protection of least tern and piping plover nests and chicks threatened with termination due to natural events, inundation due to poor nest selection under normal system operation, or flood control operations. All efforts will be made to protect nest site viability in the wild prior to collection for captive rearing. Nests will only be collected immediately preceding the inundating release to restrict renesting efforts on unstable habitats. Listed below is a sequential operating plan for nests and chicks threatened by rising water levels. All guidelines are subject to State and Fish and Wildlife Service permit approval and conditions.

NESTS

1. Consult with Reservoir Control Center for water level management options.
   a. Exercise options if available.
   b. If options not available, step 2.

2. Move nest to higher ground that will not be inundated until after the eggs anticipated hatching date.
   a. If successful continue to monitor nest.
   b. If nest cannot be successfully moved, step 3.

3. Elevate nest using a tire or other object if rise in water is expected to be short term.
   a. If successful continue to monitor nest.
   b. If water rise is expected to be long term or if nest cannot be raised, step 4.

4. Evaluate the option of egg removal and captive rearing.
   If option 4 is to be exercised, the US Fish and Wildlife Service and appropriate State agencies will be contacted for coordination and concurrence.

   a. Remove eggs to captive rearing facility to be incubated and raised for release into the wild.
   b. Remove eggs to captive rearing facility to be incubated and raised for research that will aid in meeting the recovery goals of these species.

CHICKS

1. Consult with Reservoir Control Center for water level management options.
   a. Exercise options if available.
   b. If options not available, step 2.
2. Remove chicks and place on adjacent islands within sight of adult birds, if sites unavailable, step 3.

3. Remove chicks to captive rearing facility.
   If option 3 is to be exercised, the US Fish and Wildlife Service and appropriate State agencies will be contacted for coordination and concurrence.

   a. Remove chicks to captive rearing facility to be raised for release into the wild.
   b. Remove chicks to captive rearing facility to be raised for research that will aid in meeting the recovery goals of these species.

APPENDIX B

CAPTIVE REARING PROTOCOL

CAPTIVE REARING

Captive rearing will be conducted at the recently constructed Corps of Engineers (Corps) facility at the Gavin's Point Project Office. The facility consists of a main building containing a brooding area, egg handling, incubation, and diet preparation laboratory and an office (see attached facility plans). Outdoor flight pens are attached to the rear of the facility. The building is designed to facilitate the captive rearing of interior least terns and piping plovers in a safe, clean, and healthy environment. The interior walls of the facility are sealed to allow for pressure washing and disinfection of all surfaces. The building and outdoor pens are serviced by raw Missouri River water, treated water, and enclosed sewer.

Visitation protocol will be established to limit visitor contact with the birds. Facility workers will be required to wear separate footwear in the brooder area other than that worn outdoors or in the office. Workers will also wear lab coats confined to bird handling areas. Foam alcohol hand creams will be used to minimize contamination when handling birds.

Staff from the National Biological Service, Madison Wildlife Health Laboratory were consulted on building design and facility protocols.

COLLECTION

Eggs collected at distances greater than 50 miles from the incubation laboratory at the Gavin's Point Project in Yankton, South Dakota, will be placed in a portable incubator to maintain egg viability on route to the lab. Eggs collected within close proximity (less than 50 miles) of the facility, will be collected and transported from the field to the laboratory in modified polystyrene or pressed cardboard egg cartons. This will allow for the collection operation to be expedited as quickly as possible while maintaining egg viability. Eggs will be cleaned, weighed, and candled prior to being placed in the incubator. Any nonviable eggs will be removed and sent to the Fish and Wildlife Service (Service) for disposal.

INCUBATION

Viable eggs will be placed in a Petersime Model I incubator located in the lab room (see attached facility plans). Piping plover and least tern eggs will be incubated concurrently in the same incubator. The Petersime incubator features a redwood housing, thermostatic thermometer with backup, 150 degree rotational drum egg rack with 2000 egg capacity, paddle fan, and hatcher box. Humidity will be controlled by varying the surface exposure of the water pan. Temperature will be monitored using the standard dry and wet bulb Fahrenheit thermometers provided by the Petersime Company. Incubator operation settings will be as follows to simultaneously, as closely as possible, meet the requirements of both species.

Dry Bulb Thermometer 99.5 degrees F

Wet Bulb Thermometer 87 degrees F

Relative Humidity 59-60%

Eggs will be individually identified by writing a coded number on each shell with a nontoxic felt tipped pen. Eggs will be candled and weighed Tuesday, Friday, and Sunday of each week. Weighing will allow monitoring of embryo weight loss during the incubation period. Proper humidity regulation should result in 10-10.5 percent fresh egg to hatch weight loss for piping plovers and 11-13 percent fresh egg to hatch weight loss in least terns. Candling will enable data to be collected on embryo development and will allow observers to accurately determine time to remove eggs from the rotating drum. A second Petersime incubator will be used to hatch eggs. Once membrane crowning is observed in the air cell, eggs will be removed from the incubation incubator and placed in the hatcher incubator. This will allow for sufficient time prior to the embryo penetrating the membrane into the air cell, at which time the unhatched chick is susceptible to suffocation if the egg is continually rotated. Humidity within the hatching incubator will be increased to 65-70 percent. Expected pip to hatch times are 12 to 48 hours for piping plovers and 12-24 hours for least terns. Birds will be allowed to dry off and will be individually identified with a colored nontoxic marker on the head, prior to placing them in the brooder box.

BROODING AND FEEDING

After 10 to 12 hours in the hatcher box, or when chicks are completely dried off and are able to stand, the hatchlings will be removed from the hatcher and weighed to determine hatching weight prior to being placed in the brooder box. Every effort will be made to segregate chicks from like broods into individual brooders to prevent any implications that may arise from cross-sibling imprintation. Brooder boxes will be constructed of 7/16ths AC plywood with the smooth side turned in to prevent any injuries from splinters. Box interiors will be sealed with a food grade polyurethane to reduce bacterial contamination and aid in box sanitation. Boxes will be built in 4' X 8' complexes with each individual box being 2' X 2' square and 16 inches high.

Brooder floors will be covered with indoor/outdoor carpeting which will in turn be covered with sand to protect the young birds' feet. Least tern brooders will be provided with a sand simulated nest bowl and an attending adult decoy. Piping plover brooders will have a brood pouch constructed of terry cloth towel for brooding security. Brood boxes will be covered with a fabric top and will be heated with incandescent light bulbs with brooder hoods.

Boxes will be heated to 95-98 degrees F for three to five days with the temperature slowly being decreased as birds began to feather and thermoregulate themselves. Hatchlings will be kept in the brood boxes until their feather tracts are fully feathered (approximately 12-14 days) and they are able to fully thermoregulate. Boxes will be cleaned and disinfected Monday and Thursday of

each week using Germacert[tm] nontoxic disinfectant. Chicks will be weighed during the brooder cleaning to track weight gain and adjust diet to ensure proper nutrition.

Recommended Diets:

Piping Plovers 1-3 days old - mini meal worms, brine shrimp, blood worms, pinhead crickets, black worms, and fly larvae. Supplement with commercial chick starter.

Piping Plovers 3+ days old - regular meal worms, brine shrimp, blood worms, wax worms, baby crickets, and locally collected insects. Supplement with a poultry starter for filler.

Least Terns 1-3 days old - locally seined fish fry 1 to 1.5 centimeters in length, or small fathead minnows.

Least Terns 3+ days old - endemic forage fish, i.e., shiners, mooneye, fathead minnow, freshwater drum, etc., not to exceed 3-5 cm.

Piping plovers will be fed a complete diet containing items above that are available from a local supplier along with insects trapped on-site nightly. Dry food items will initially be sprinkled on the floor of the brooder box to stimulate the young chicks' pecking behavior. Meal worms will be fed to full gut pack with insect meal containing 10% calcium and 0.7% phosphorous. Once chicks become accustomed to foraging, all food will be provided in plastic petri dishes to aid in box sanitation. Piping plover chicks will be provided with an unlimited food supply along with Petamine[tm] bird vitamins, to meet additional nutritional requirements. Diets will be monitored and adjusted according to a nutritional assay of food items obtained for least tern and piping plover forage.

Least terns will be fed several species of endemic forage fish fry until three days of age at which time they will be switched to a variety of locally seined river forage fish and fathead minnows purchased from a local supplier. All forage fish will be injected with a water and fat soluable vitamin solution. Available fish species will be analyzed for thiaminase and a variety of fish will be used as feed so thiamin deficiencies can be avoided. Fish supplied locally from seines or a supplier will be held at Gavin's Point National Fish Hatchery then placed on ice prior to being fed to the birds. While in the brooder boxes forage for the least terns will be hand fed using a white surgical glove and forceps. All feeding will be conducted in complete background darkness to minimize the association between humans and feed. Once the birds become accustomed to grabbing the fish, fish will be provided in a drop in pan filled with water to train the birds to self feed. Least terns will be fed every two hours from 7:00 a.m. to 9:00 p.m. or more frequently as needed.

Both species will be given unlimited water in shallow petri dishes. Taped vocalizations recorded at a least tern and piping plover nesting colony during feeding activity will be played intermittently in the brooder to provide a vocal identity for the chicks. Brooder boxes will be

rolled outside each day for a minimum of two hours. This will ensure vitamin D is metabolized and that bone development deficiencies are avoided.

All feeding utensils, petri dishes, and the brooder and laboratory will be disinfected at least once per day with a broad spectrum disinfectant. All personnel feeding or handling chicks or otherwise doing general maintenance in the brooder room or lab will apply foamed alcohol hand cream to prevent cross contamination.

When chicks are 12-14 days old and are able to feed and thermoregulate themselves, they will be transferred to the outdoor flight pen. The outdoor pen is 48 feet by 60 feet and contains 6, 20 feet by 20 feet warm release pens. Three of these pens are designed for plovers and contain 10 feet by 20 feet sand pads and 10 feet by 20 feet beach/pool habitats which gently slope from ½ inch to 6 inches deep. The remaining three pens, designed for terns, also contain a 10 feet by 20 feet sand pad but the pool habitat slopes from ½ inch to a maximum depth of 1 foot. The pool habitats are individually contained and receive continuous flow of raw river water (see attached facility plans).

The outdoor pen's exterior walls and dividers are constructed of a three foot high concrete stub wall. Pen floors and pool bottoms are continuous concrete that abuts an elevated center walkway. Eight foot chain link fencing is attached to the stub wall and is lined with shade netting. Eleven foot high exterior walls support a vinyl coated wire mesh roof which rises to 25 feet at the center, providing opportunity for terns to aerially forage over the pool habitat.

Prior to new broods being placed in pens, the pens will be bleached where possible and sand areas raked and exposed to ultraviolet light.

Food will be provided to the pens from the center walkway access until chicks are fully feathered, self-foraging, and are capable of sustained flight. At this time they will be captured with a drop net and banded for release.

RELEASE AND POST-RELEASE MONITORING

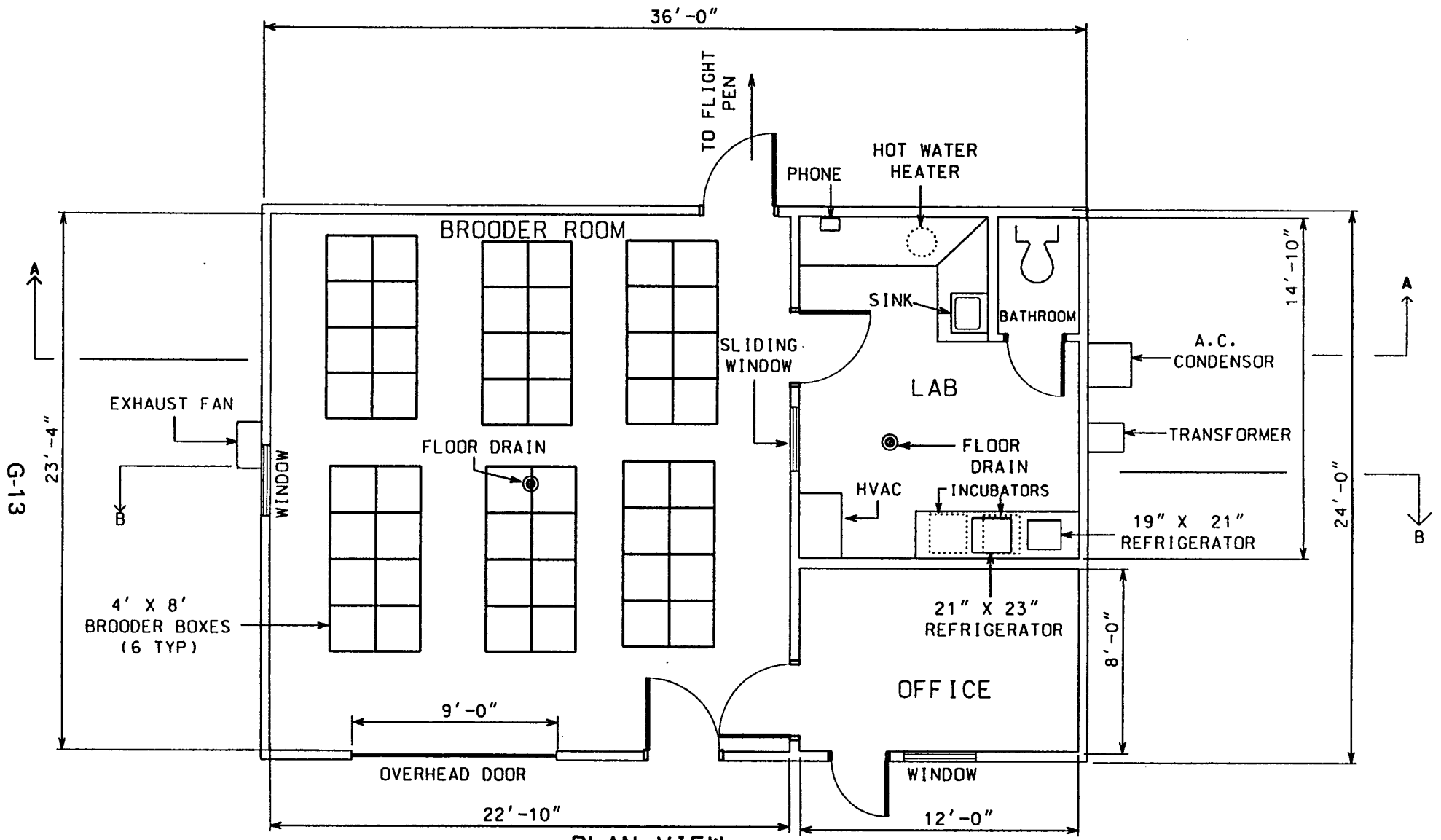
Under a Corps banding permit, least terns will be banded with size 1A stainless steel serially numbered Fish and Wildlife Service bands. Color bands (Darvic tm plastic manufactured by A.C. Hughes) may be used if a technique can be developed to insure band retention. Piping plovers will be banded with size 1A stainless steel serially numbered Service bands. A colored flag (UV stable, Darvic tm plastic manufactured by A.C. Huges) will be applied to the upper leg opposite the Service band.

Banded fledglings will be released on sandbar habitat that provides a secure release substrate for a minimum of two weeks post-release. These habitats will be determined to have sufficient elevation to remain exposed during increases in discharges and also will have an available food source for the fledglings. Close coordination with State and other Federal agencies will be undertaken to ensure suitable habitats are located for release sites prior to birds fledging. Many

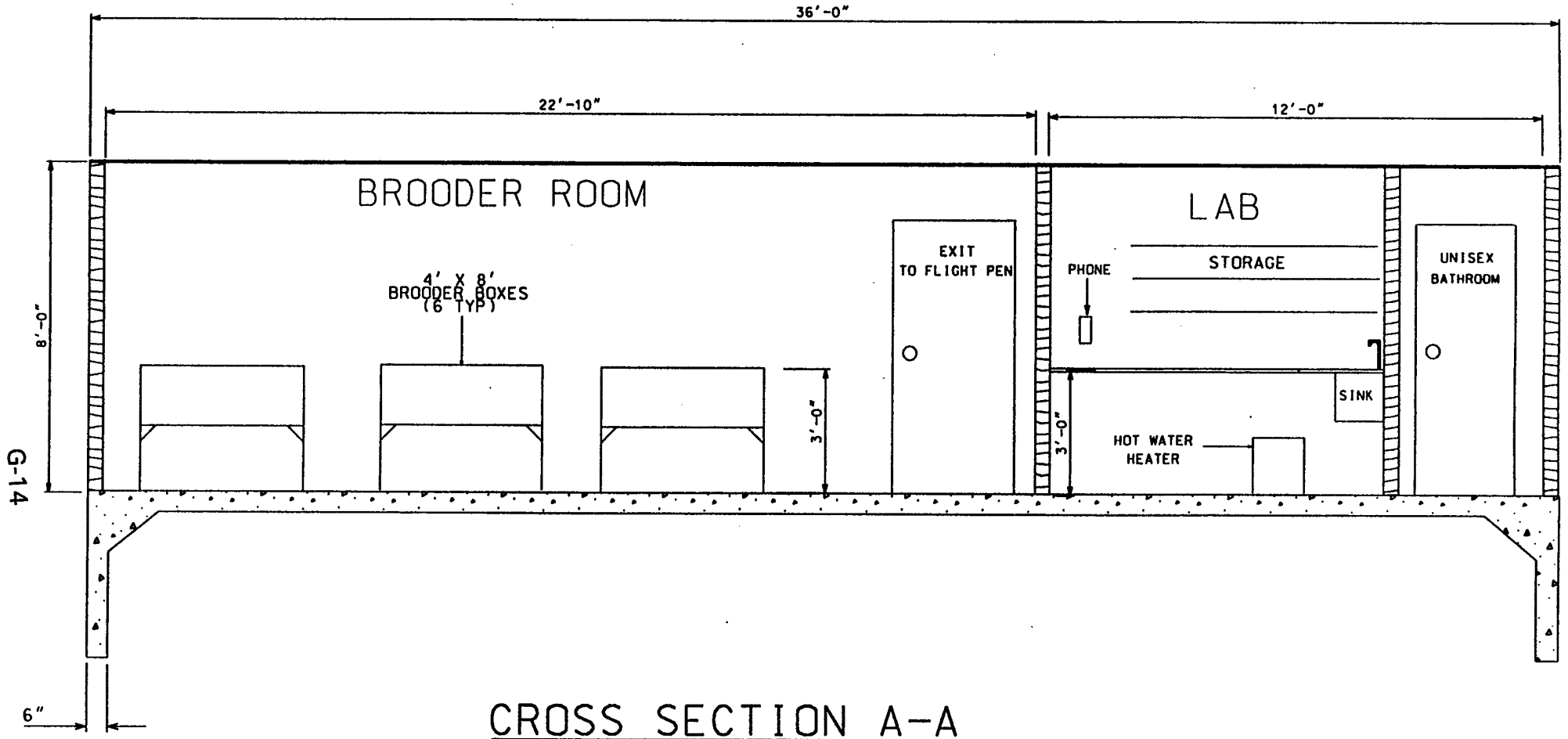
of the constructed sites built by the Corps in previous years below Gavin's Point Dam should provide suitable release substrates.

Piping plover chicks of individual broods will be grouped and released onto sandbars with no existing nesting or brooding piping plover adults or released into staging flocks of young-of-the-year flighted piping plover chicks. Least tern chicks of individual broods will be grouped and released near active least tern colonies where young-of-the-year least terns are fledging and beginning to forage for themselves, or released into staging flocks of young-of-the-year flighted least tern chicks when available.

Least tern and piping plover chicks will be transported to release areas in modified poultry shipping crates. Chicks will be hard-released onto the release areas. Release sites will be monitored daily for the first seven days post-release and twice weekly after that until the birds decease or leave the release area. Birds will be observed from a secluded spot off-site using binoculars and spotting scopes. Detailed observations will be made as to the released birds' foraging behavior and success and also as to the social integration back into the wild flock. If birds are noted to be unable to obtain their own food, supplemental feeding may be undertaken to support the birds until they are able to do so on their own. Efforts will be coordinated through the Service to monitor wintering grounds for successfully migrating birds, and observations will be made on the breeding grounds during subsequent nesting seasons to determine actual contributions of the captive raised birds to the reproductive pool.

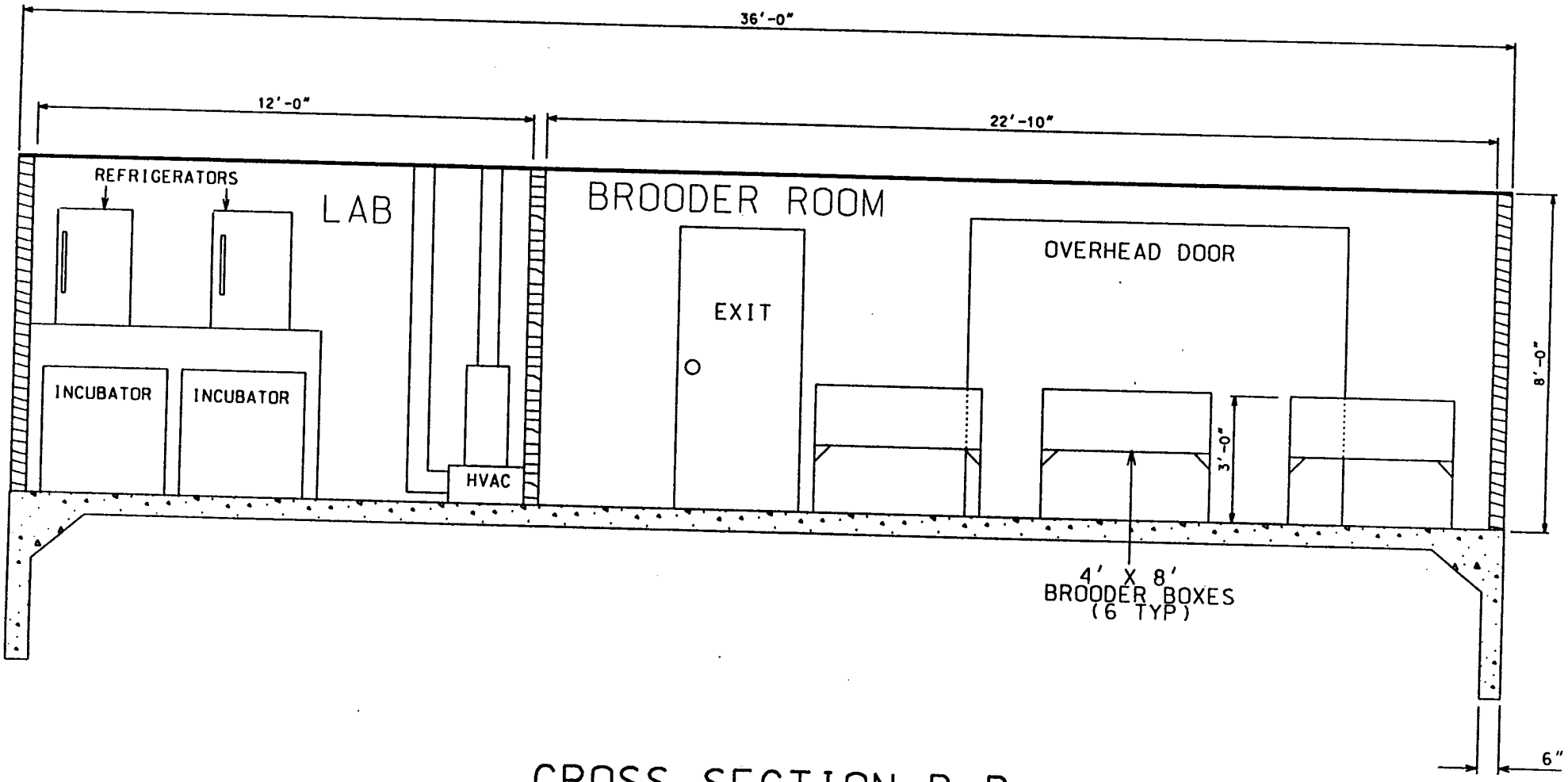


PLAN VIEW
CAPTIVE REARING BUILDING



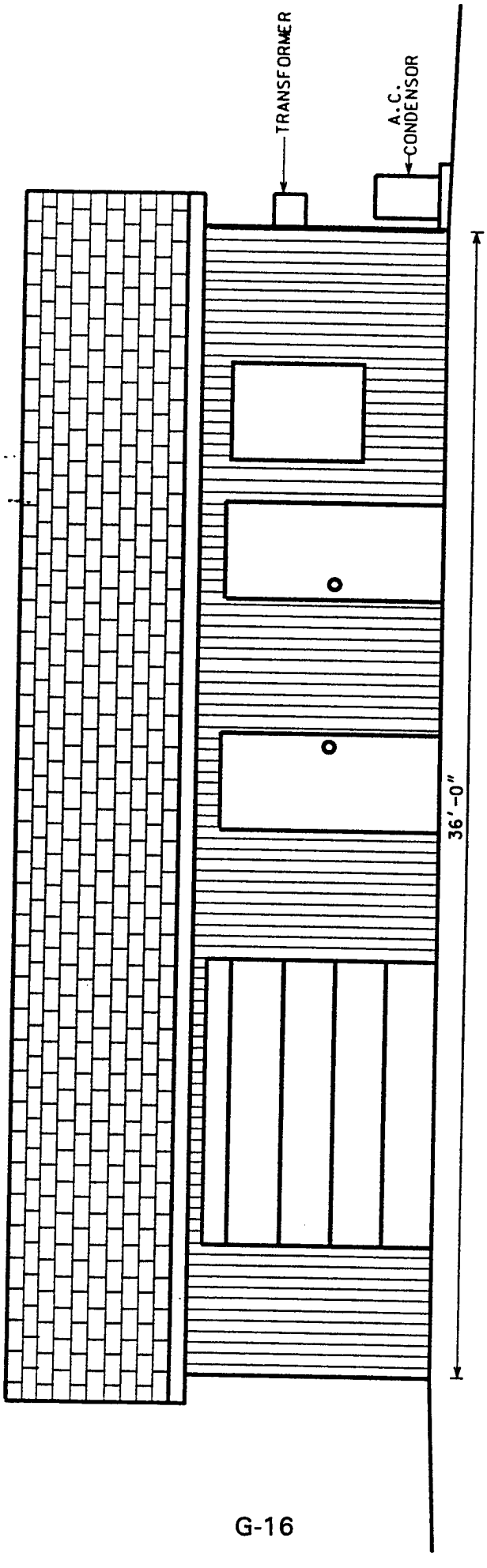
CROSS SECTION A-A

CAPTIVE REARING BUILDING



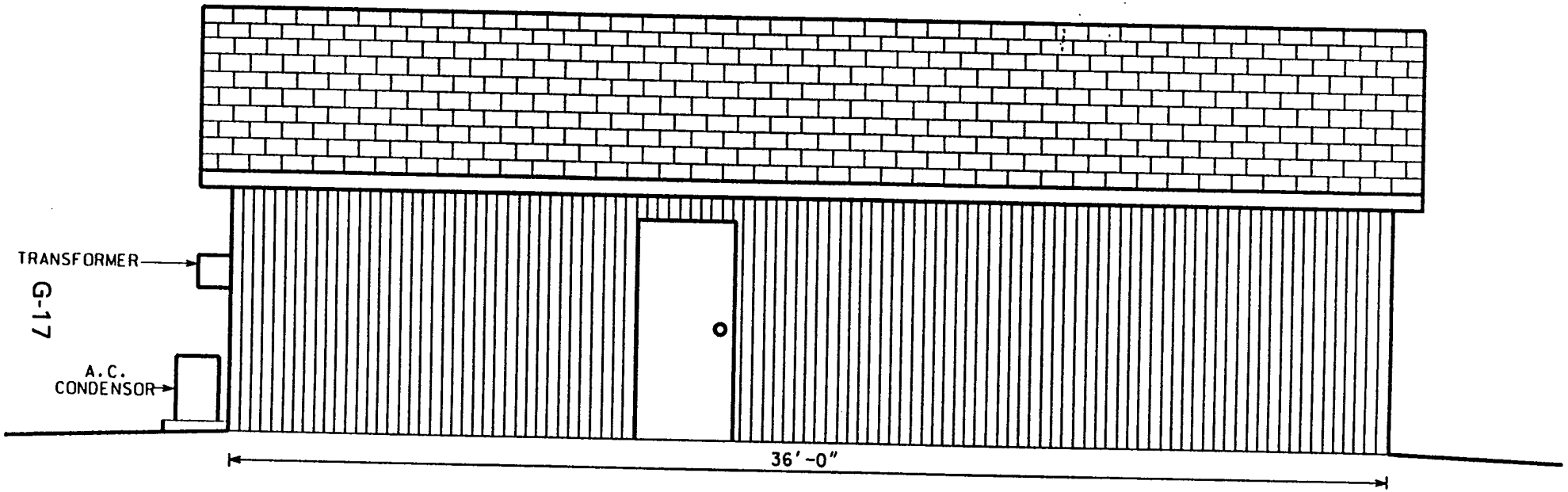
CROSS SECTION B-B

CAPTIVE REARING BUILDING



EAST ELEVATION

NO SCALE



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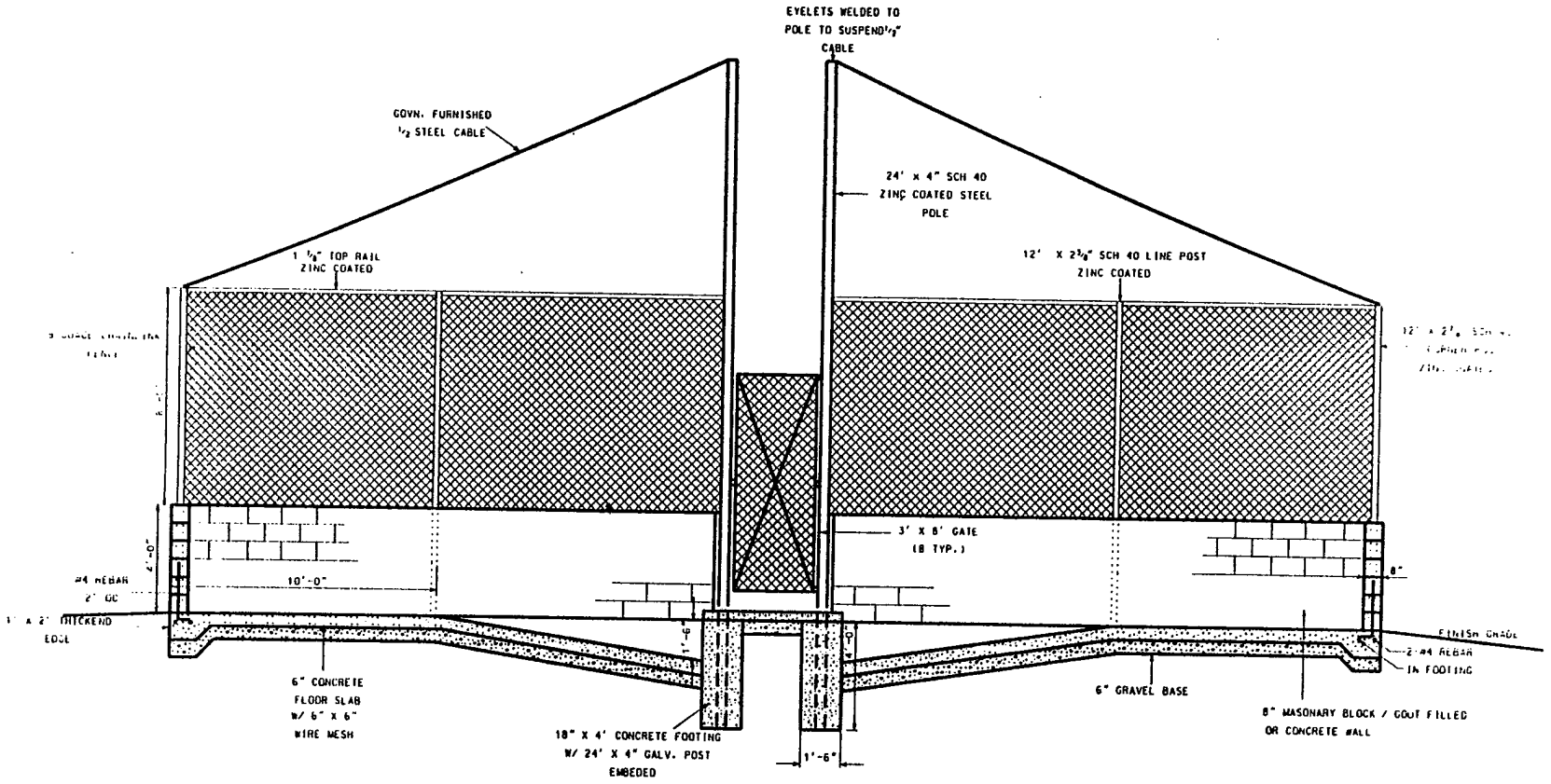


CROSS SECTIONAL END VIEW A-A
FLIGHT PEN

Symbol	Revisions Descriptions	Date	Approved
	REVISED		

88 TRNK VALUE ENGINEERING-88

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
OMAHA, NEBRASKA

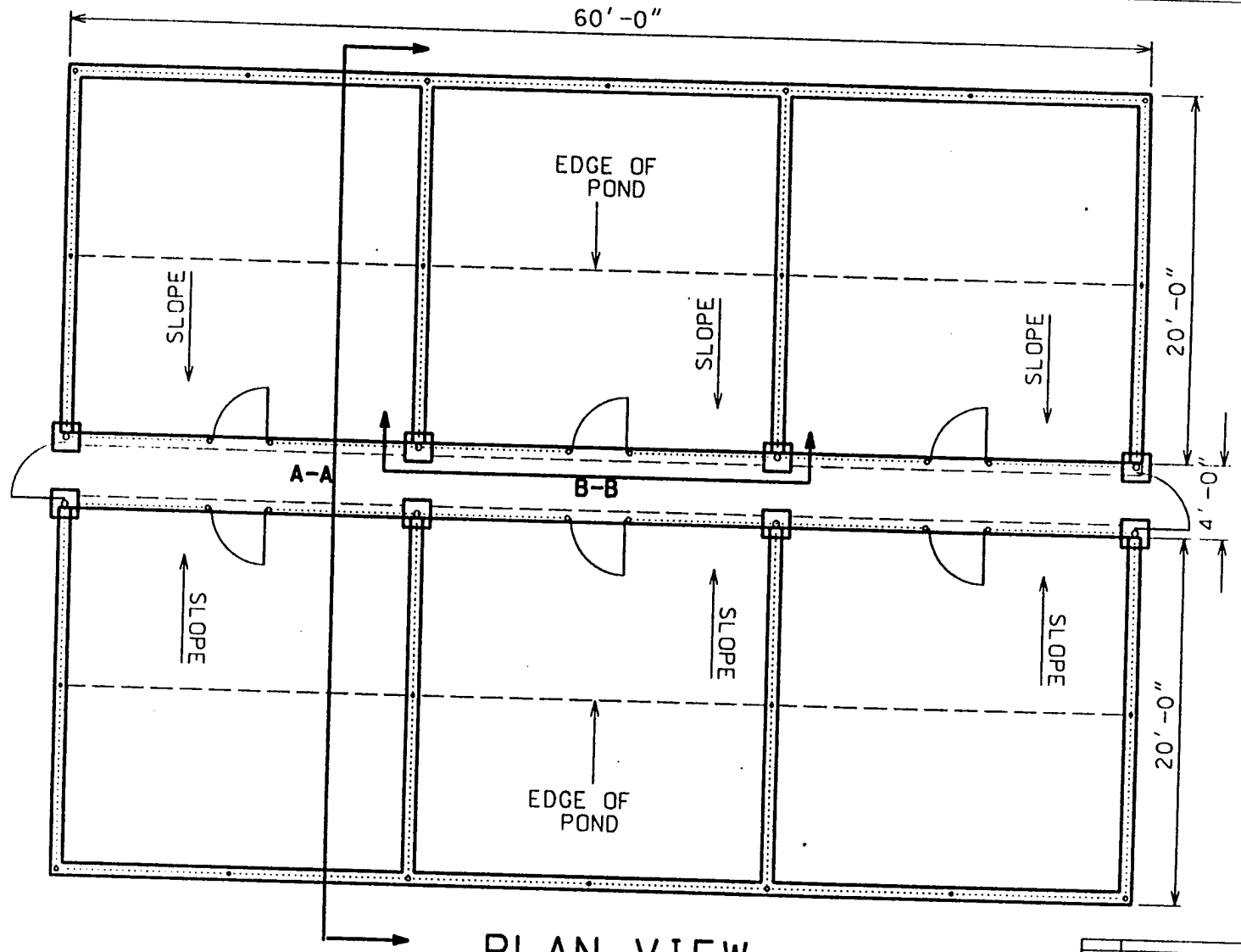
Designed by:
Drawn by:
Checked by:
Reviewed by:
Submitted by:

GAVINS POINT DAM
YANKTON, SD
T&E FLIGHT PEN

Scale As Shown | Plot Scale Ratio | Date
Spec No | Sheet Number 2 | Drawing Code
Contract No

SAFETY

G-18



PLAN VIEW
FLIGHT PEN

Symbol	Revisions Description	Date	Approved
	REVISED		

SS-THINK VALUE ENGINEERING-SS

U S ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
OMAHA, NEBRASKA

GAVINS POINT DAM
YANKTON, SD
T&E FLIGHT PEN

Designed by:
Drawn by:
Checked by:
Reviewed by:
Submitted by:
Date
Index

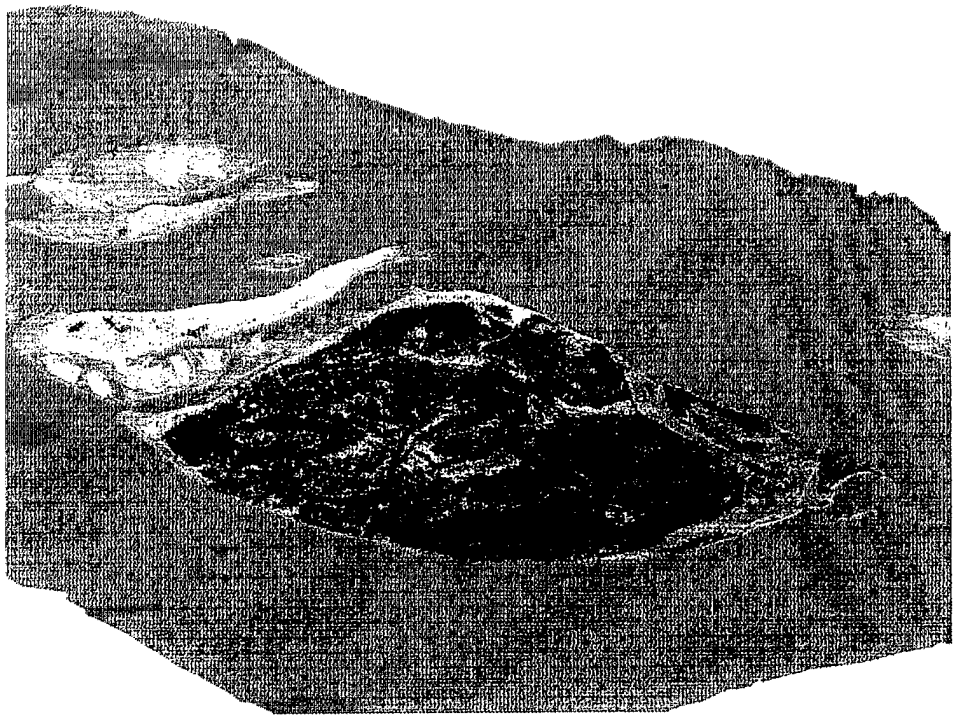
Scale: As Shown
Prod. Scale Note
Design File:
Spec No.:
Contract No.:
Sheet No.: 1
Drawing Code

G-19

APPENDIX H

HABITAT MAPPING

Color Infrared Digital Ortho Photograph



Supervised Classification

The Color Infrared Digital Ortho photograph was flown on June 1-4, 1996.

Releases from the Gavins Point Dam on June 1-4, were 34,900-39,000 CFS.

Both images are of the same island located at rivermile 803.9.

SCALE 1:40000

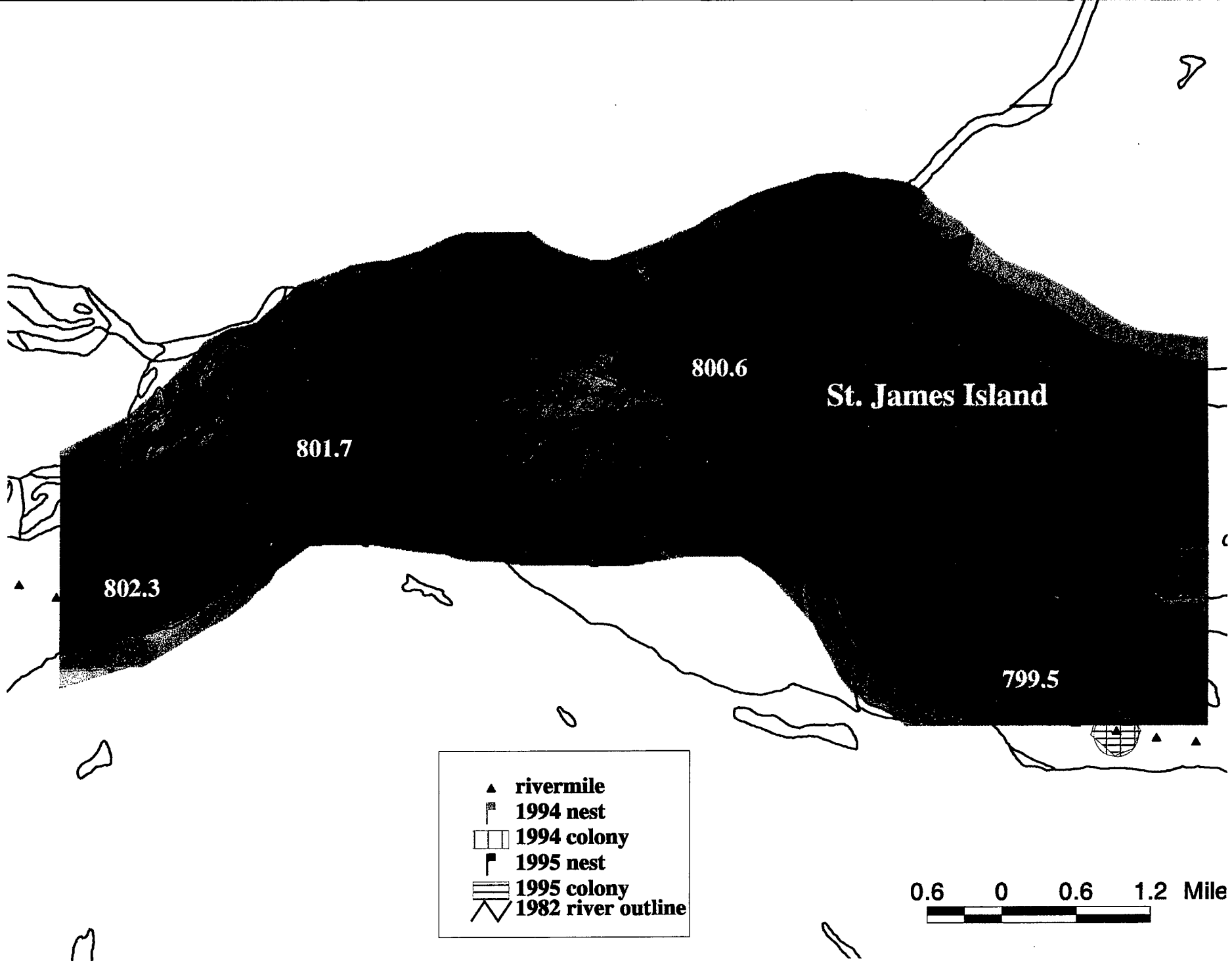
250 0 500 1000

METERS

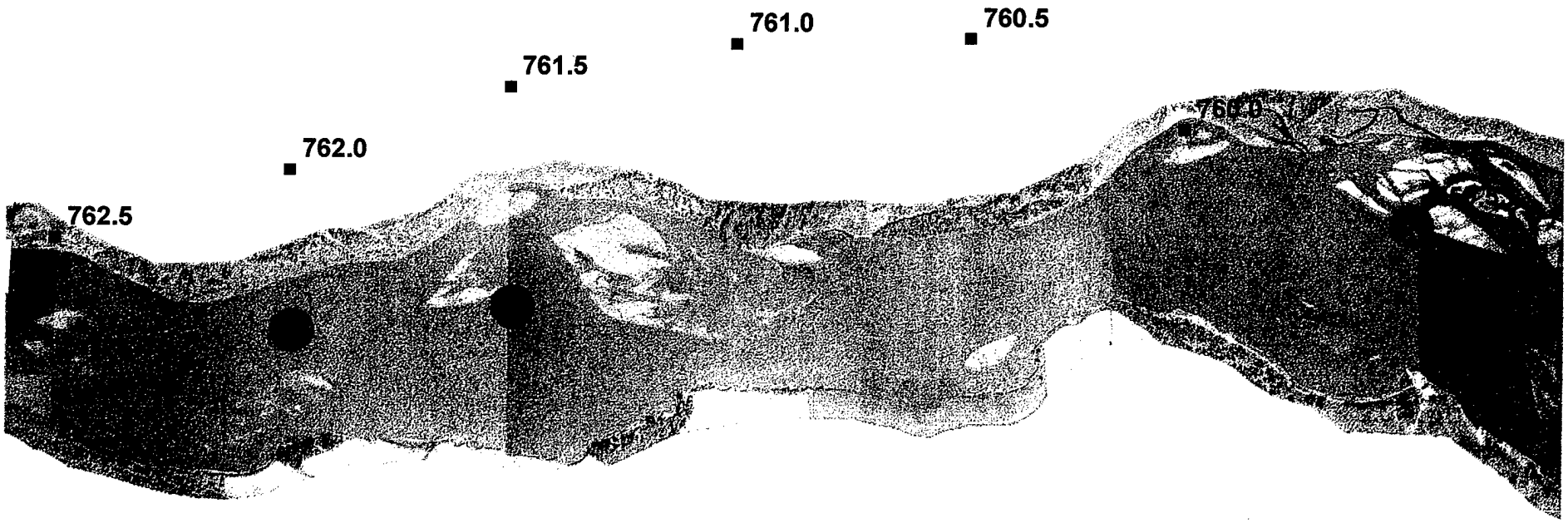
N

Classes

- **No data**
- **Shadows**
- **Water**
- **Wetland Ground Cover**
- **Nesting Sand**
- **Foraging Sand**
- **< 10 o/o Ground Cover**
- **10-25 o/o Ground Cover**
- **>25 o/o Ground Cover**


800.6
St. James Island
801.7
802.3
799.5
rivermile
1994 nest
1994 colony
1995 nest
1995 colony
1982 river outline
0.6 0 0.6 1.2 Mile

MISSOURI RIVER
GAVINS POINT DAM TO PONCA
RIVER MILES 759.5 TO 762.5
1996 LEAST TERN/PIPING PLOVER HABITAT



H-4

LEGEND

- PIPING PLOVER
- LEAST TERN
- RIVER MILES

1000 0 1000 2000 Feet

N

APPENDIX I

OTHER STUDIES

A proposal to investigate piping plover survival on the Missouri River

Submitted to Dr. R. Scott Lutz
By Robyn Anne Niver
M. S. Candidate
Department of Wildlife Ecology
University of Wisconsin-Madison

TABLE OF CONTENTS

INTRODUCTION AND JUSTIFICATION

Description

The piping plover (Charadrius melodus) is 1 of 6 North American species of belted plovers, distinguished by their melodic call and brightly colored orange legs. Adults have a body length of 17cm and weigh 46-64g (USFWS 1994). During the breeding season, adults have a single black band across the breast and forehead, and orange bills. Plumage is similar in both sexes but males typically have brighter and more extensive forehead and breast bands and may have a black mustache in the malar region (Haig and Oring 1988). Most adult plovers can be sexed more easily through observation of courtship displays (Haig and Oring 1988). After breeding birds lose the bands and the bill is black. Juvenile plumage is similar to nonbreeding adult plumage.

Status

Piping plovers were listed on the National Audubon Society's Blue List for threatened species in 1973 (Haig 1985). In December 1982, the U. S. Fish and Wildlife Service (USFWS) identified piping plovers as possible candidates for the Federal Endangered Species List (USFWS 1988). They were placed on the Federal Endangered Species List in January of 1986 (USFWS 1988), listing the Northern Great Plains and Atlantic Coast plovers and plovers on migration and wintering sites as threatened and the Great Lakes plovers as endangered. Piping plovers breeding in Canada were classified as endangered in 1985 by the Canadian Wildlife Service (Haig and Oring 1985).

Life History

Piping plovers are territorial shorebirds that arrive at breeding grounds in April and May, with adults often returning to the same nest sites in succeeding years (Wilcox 1959, Cairns 1982, Haig and Oring 1988,Wiens and Cuthbert 1988). If the original nest is destroyed, plovers often renest within 100-200 feet (Wilcox 1959). Full clutches consist of 4 eggs, with 1 brood raised per season. But rare instances have been reported in which 2 broods have been raised in a season (Bottitta et al. 1997). Both sexes incubate an average of 24-29 days

(Wilcox 1959, Cairns 1982, Faanes 1993). As chicks leave the nest soon after hatching, little is known about their survival (Prindiville Gaines and Ryan 1988). Even less is known about the plovers once they have fledged, approximately 21-28 days after hatching. By July and August, plovers flock on undefended feeding areas and begin migration (Cairns 1982, Prindiville Gaines and Ryan 1988).

Distribution

Piping plovers have historically bred in 3 distinct areas of North America: the Atlantic Coast region from Newfoundland to South Carolina, the Great Lakes beaches, and the Northern Great Plains/Prairie region from the provinces of Alberta, Saskatchewan, Manitoba, and Ontario, to the Northern Great Plains states. These ranges remain similar today except for the Great Lakes region, in which breeding grounds have been reduced to parts of northern Michigan (USFWS 1994).

Wintering grounds have received much less attention than breeding grounds in the past. Piping plovers are known to winter along the southern Atlantic Coast and the Gulf of Mexico but there are many possible wintering sites that have not yet been surveyed.

Breeding surveys in the early 1980s reported 2137-2684 adult plovers in the Northern Great Plains/Prairie region (Haig and Oring 1985). Twenty-eight adults were observed in the Great Lakes region, and 1370-1435 adults were observed in the Atlantic Coast. Surveys on the wintering grounds during the same time interval recorded 25% of the breeding estimates. There are no explanations for the difference in population size. Many wintering grounds may currently be undiscovered.

In 1986, USFWS appointed the Atlantic Coast and Great Lakes/Northern Great Plains recovery teams to develop conservation plans to aid in the future management of piping plovers (USFWS 1988). In 1991, the first International Piping Plover Census was designed by the U.S. Great Lakes/Northern Great Plains Piping Plover Recovery Team and carried out with the Atlantic Coast Piping Plover Recovery Teams in the U.S. and Canada, and the Prairie Canada Piping Plover Recovery Team (Haig and Plissner 1993). This was an important step

for surveying piping plovers on breeding and wintering grounds, as census methods and timing would be similar in all areas. Results of the 1991 breeding ground surveys were: 1,975 adults in the Atlantic Coast region, 40 adults in the Great Lakes region, and 3,467 adults in the Northern Great Plains/Prairie region (Haig and Plissner 1993). On the wintering grounds 3,451 plovers were recorded, with the majority observed in Texas (Haig and Plissner 1993). A second International Census took place in 1996 and the results of these surveys were: 2,581 adults in the Atlantic Coast region, 48 adults in the Great Lakes region, and 3,284 adults in the Great Plains region (Plissner and Haig 1997). In the wintering grounds, 2,515 plovers were surveyed (Plissner and Haig 1997).

Great Plains Region

The piping plover nests on wide beaches with slight vegetation throughout its range (Prindiville Gaines and Ryan 1988). Some of the best habitat may be found in the Great Plains due to the relatively small human population near beaches and sandbars (Prindiville Gaines and Ryan 1988). The 1991 International Piping Plover Census reported major piping plover breeding sites in Montana, North and South Dakota, and Nebraska (Haig and Plissner 1993). Montana plovers breed on sandflats, shorelines of the Missouri, and saline wetlands. Approximately 15% of North Dakota plovers nest along the Missouri River while 85% nest in alkali wetlands on the Missouri Coteau (USFWS 1994). In South Dakota, most breeding occurs on sandbars along the Missouri River. Nebraska plovers breed along the Missouri, Niobrara, and lower Platte Rivers. Haig and Plissner (1993) reported 59.6% of northern Great Plains/Prairie plovers used alkaline lake habitat, 18.2% used reservoir beaches, and 19.9% used river islands and sandpits. Surveys in the 1996 International Census found fewer plovers along reservoirs (7%) and river islands (8%) and an increase of plovers along alkaline lake habitat (75%) (Plissner and Haig 1997). This may be attributed to the increased flows of the Missouri River during these surveys. There simply wasn't habitat available to the plovers.

Current survival estimates of piping plovers are limited. Root et al. (1992) estimated a mean annual adult survival rate of 0.664 using recapture and resighting data from the John E.

Williams Memorial Nature Preserve, North Dakota for the Great Plains population from 1984-1990. With low mortality rates on the breeding grounds, most mortality occurs during migration or on wintering grounds (Root et al. 1992), but there is little information from these areas. An annual fledging rate of 1.15-1.44 chicks/breeding pair was calculated as essential to stabilize the Great Plains piping plover population (Prindiville Gaines and Ryan 1988). A problem with this model is the lack of juvenile survival data. Juvenile survival rates were estimated as a percentage of known adult survival. Ryan et al. (1993) constructed a population model for piping plovers in the Great Plains, again using estimates of immature survival rates based on adult survival. They suggested fledge rates of 1.13 chicks/breeding pair, adult survival rates of 0.72, and immature survival rates of 0.65 were necessary to keep the population stable, while actual values were 0.86 for fledge rates, 0.66 for adult survival rates, and 0.60 for immature survival rates. Evidence points to a decline in Great Plains piping plovers with projections of extirpation in approximately 80 years (Ryan et al. 1993).

Reasons for Declines and Possible Remedies

Habitat loss and degradation.--The Missouri River and its tributaries has a drainage basin of over 529,000 square miles (COE 1996). Historically the Missouri River flows would rise in early spring from snow melt on the plains and peak again in June due to snowmelt from the Rockies; flows would then decline throughout the summer and fall (COE 1996). Flooding was a natural occurrence and was not much of a "problem" until towns grew up along the river. In 1944 the Flood Control Act became law and authorized the construction of dams on the Missouri and its tributaries (COE 1996). Six main dams were constructed along the stretch of the Missouri between Montana and South Dakota and the stretch from Sioux City, Iowa to St. Louis, Missouri was channelized and dredged (COE 1996). The damming, channelization, and withdrawal of water from the Missouri River and its tributaries have eliminated nesting sandbar habitat along hundreds of kilometers of river (Sidle et al. 1991:353).

On November 14, 1990 the Army Corps of Engineers (COE) received a jeopardy

Biological Opinion on the operations of the Missouri River (COE 1996). The USFWS concluded that operations of the Missouri River were likely to jeopardize the species through the loss of habitat supporting approximately 22% of the northern Great Plains population (Sidle et al. 1991). The COE system operations of the Missouri River have directly contributed to loss of plover eggs and chicks due to increased releases for flood control, hydropower, or navigational purposes during the nesting season. In addition to these direct effects, riverbed degradation and trapping of sediments at reservoirs has decreased sandbar habitat formation. Controlling river flows during the nonbreeding season can decrease plover productivity similar to permitting excessive flows during the nesting season. When river system management does not allow regular scouring of the river, vegetation encroachment is likely to occur on higher islands.

Upon receiving the Biological Opinion, the COE intensified their efforts to gather piping plover life history information (COE 1996). The COE began surveys and monitoring of the Missouri River in 1993 (COE 1996) and initiated a salvage program in 1995 to prevent the taking of nests during uncontrolled flood operations as advised by the USFWS (Keenlyne 1996). This program consists of salvaging eggs and chicks that would be lost due to natural flooding events of the Missouri River. Eggs and chicks are raised at a COE breeding facility at Gavins Point and released back to the wild after fledging. COE biologists worked closely with zoo curators, nutritionists, and veterinarians to determine proper diet and rearing facilities for the plovers. Great measures are taken each summer to insure the greatest success with the captive birds. Only trained personnel are allowed in the captive rearing facility, which is kept clean and sanitized. Plovers are fed invertebrates and given vitamin supplements every 3 hours. An outside flight pen was built in the summer of 1997 for fledged plovers. They have simulated sandbar habitat to better prepare the plovers for release into the wild.

Predation.--Avian and mammalian predators are a major threat to plover productivity throughout the species' breeding range (Sidle et al. 1991). Predator exclosures and electric fences have been used with some success in decreasing this problem (Rimmer and Deblinger

1990, Mayer and Ryan 1991, Melvin et al. 1992).

Human Disturbance.--Human disturbances have been documented in Atlantic Coast plovers (Haig and Plissner 1991, USFWS 1996) and in the Great Plains region, sandbars are often used for recreational purposes during the nesting season (Sidle et al. 1991). Pedestrians may keep plovers from using suitable nesting habitat or flush incubating birds from nests (USFWS 1996).

Weather.--Heavy rains and winds, as well as hailstorms have been observed to cause mortality in plover adults and chicks. Winter storms also can have a negative affect on plover survival.

Concerns

Working with an endangered species brings a unique set of complications and concerns to my research. I have anticipated some possible issues and addressed each concern below.

Banding.--There is currently a great deal of concern in the piping plover community about injuries to piping plovers from leg bands. Reed and Oring (1993) reported aluminum, steel, and plastic colored leg bands are occasionally associated with foot injury or loss in shorebirds. Nationwide foot-loss rates for piping plovers were 1-3% (Reed and Oring 1993). Lingle and Sidle (1993:10-14) reported 7% of resightings were injured marked plovers. Following reports of piping plover injuries, the Northeast Region and the Rocky Mountain and Plains Region of the USFWS placed a moratorium on leg banding in 1989 (USFWS 1996). While the USFWS recognizes this problem, banding is allowed when important for research (N. McPhillips, USFWS, pers. commun.). Efforts are being made in the construction of a new band suitable for plovers.

Telemetry.--There may be concern about placing transmitters on piping plovers due to the size and nature of the birds. Currently, there is little data available on the weights of fledged plovers. Wilcox (1959) observed average 21 and 29-day plover weights to be 25.7 and 29.4g respectively while Cairns (1982) estimated plovers to weigh approximately 44g at 24 days. In 1997 I recorded an average weight for salvage chicks (n=16) of 41g for plovers 22-38 days old

(R. Niver, COE, unpubl. data). I will only radio plovers 40g using transmitters 1.0g (2.5% body weight) to reduce potential harm to the birds. Also, I will use 10cm antennae to prevent possible injuries to plovers and transmitter damage, due to dragging on the sand and catching in vegetation.

Other studies have successfully used radio telemetry to track relatively small passerines and shorebirds. Sykes et al. (1990) reported adhesives as a favorable transmitter attachment method for small passerines. Signs of skin abrasion or feather wear were absent, and behavioral differences were not observed after transmitter attachment (Sykes et al. 1990). Using similar attachment methods, Hill and Talent (1990) did not observe any adverse reactions to transmitters in least terns or snowy plovers. Warnock and Warnock (1993) used an adhesive method for attaching transmitters to sandpipers and observed an acclimation period of 3 days. Potential problems associated with radios included predation during the 3-day window of acclimation and an infrequent loss of the ability to fly. Once transmitters were removed from these birds, normal flying resumed.

While there may be concerns with plover telemetry, it is important to note the COE successfully radioed 25 plovers (35.05-75.8g) in 1996 using 1.0g transmitters (G. Pavelka, COE, unpubl. data). Also, researchers on the wintering grounds are currently having great success using radio telemetry with snowy and piping plovers (K. and K. Drake, pers. commun.). There will be experienced biologists on hand to aid in the tagging process during this study. Finally, it is absolutely necessary to radio plovers if we are to determine post-fledgling survival rates.

Captive Rearing.--Promising results have been reported for captive-rearing as a management tool for snowy plovers (Page et al. 1989), and killdeer as a surrogate species for piping plovers (Powell and Cuthbert 1993). In addition, captive rearing has occurred without major problems for the past 3 years at the COE Gavins Point facility. But, after releasing fledged plovers, there is little information available on their survival. In 1995, 197 piping plover eggs and 16 chicks were collected from sandbars of North Dakota, South Dakota, and

Nebraska (G. Pavelka, COE, unpubl. data). Thirty eggs were incubated at zoos and 167 eggs were incubated at Gavins Point. Of the 197 eggs and 16 chicks, 168 eggs hatched and 165 chicks fledged. One hundred and forty two plovers were released in Nebraska and South Dakota. In 1996, 140 eggs were collected from North Dakota, South Dakota and Nebraska sandbars on the Missouri River and reservoirs. Of the 140 eggs, 115 hatched and 104 chicks fledged. One hundred and two fledged juveniles were released in Nebraska and South Dakota. In 1997, 31 piping plover eggs were collected from North Dakota. Twenty-six eggs hatched and 26 chicks fledged. Twenty-four juveniles were released in Montana and Nebraska. Of all birds released, there have been 2 resightings, both in 1997, of banded plovers. One was caught in a sandpit in Nebraska and confirmed as a captive-reared plover and the other was sighted on the Niobrara and guessed to be a captive-reared bird.

Even with the COE's history, there may be concerns with the use of captive rearing. Four main concerns were discussed at the Missouri River Natural Resources Committee (MRNRC) meeting (Keenlyne1996). The primary concern was the salvage program not be a quick fix to not reaching fledge ratios goals on the Missouri River. The second concern was the need for the program to focus on gathering scientific data. The third concern was the lack of information about the release of captive-reared birds and the fourth concern was a trust issue questioning the need for such a program (Keenlyne 1996). Concern was expressed by the states and Service that there is no evidence that salvage provides any long-term population benefits (MRNRC 1997). Alternatively, Powell and Cuthbert (1993) determined captive-rearing might be a useful management tool for augmenting piping plover populations. They stated the importance of implementing such tools before populations become too small.

Currently, the only options are to allow the plover eggs and chicks to wash down the Missouri River or be raised by the COE. While plovers have historically nested in volatile systems like the Missouri River, the population has declined to a point in which action such as the salvage program may be necessary to insure productivity for that year. Until water level management practices change, riverside development decreases, or habitat manipulation

becomes a more feasible management technique, captive rearing gives us the opportunity to do something about the problem of decreasing plover numbers along the Missouri River. A secondary benefit of the salvage program is the possibility for public education by placing some of the birds in zoos (Keenlyne 1996). Studies of captive-reared plovers may also answer questions to problems such as banding compaction. This study will answer the question of whether captive-reared and wild-reared piping plovers have significantly different success rates, providing currently missing information about wild-reared fledgling survival rates, which can be used in Great Plains population models (Ryan et al. 1993).

GOAL

To help evaluate captive-rearing as a management tool for the threatened piping plover.

OBJECTIVES

1) To determine survival rates of fledged piping plovers, prior to fall migration.

2) To compare the survival rates of captive-reared and wild-reared piping plovers.

3) To compare the behaviors of captive-reared and wild-reared piping plovers.

4) To evaluate captive rearing as a management method on the Missouri River.

STUDY SITE

I will work with piping plovers in the Great Plains region of the United States. Birds and eggs will come from the sandbars of the Missouri River from Fort Peck Lake, Montana (River Mile 1785.0) to below Gavins Point, South Dakota (River Mile 750.0). The majority of my study will occur between southeast South Dakota and northeast Nebraska (River Miles 845.0-750.0). Captive rearing will be done at Gavins Point.

METHODS

Locating Adults

The COE will conduct weekly surveys along the Missouri River beginning the first week of May and continue until birds have migrated in late July and early August. All sandbars suitable for plover nesting will be surveyed by boat (Wiens and Cuthbert 1988, COE 1996). If the Missouri River is flowing at unusually high levels, all sandbars with any probability of

plover nesting will be surveyed.

Locating and Marking Nests and Chicks

If we hear or see any plovers during boat surveys, we will survey sandbars on foot for nests and/or chicks. Along with the COE, I will locate nests by observing adult plover behavior. Plovers respond to intruders by performing injury feigning displays (Wilcox 1959, Cairns 1982); this will identify nearby nests. Once we locate nests, we will place wooden tongue depressors in the sand approximately 1m away from nests to mark the nests for future observations (Hill and Talent 1990).

When nests are found, biologists will float the eggs to determine days of incubation and predict hatch dates (Hays and LeCroy 1971, COE 1996). Eggs will only be tested after we have determined a full clutch has been laid. Incubation averages 24-29 days (Wilcox 1959, Cairns 1982, Faanes 1993). I will monitor nests on a daily basis to accurately record hatch dates and locate chicks.

Protecting nests from predators

The COE will place predator exclosures over piping plover nests to increase nest success and fledge ratios (Rimmer and Deblinger 1990, Melvin et al. 1992). Because of this nest protection, I expect adequate numbers of plovers will be available for my post-fledging survival investigations.

Captive Rearing

As per the scientific collection permit guidelines, the COE and USFWS will determine sites for collecting plover eggs (Appendix 1). The COE will collect approximately 50 piping plover eggs during late May or early June. Eggs in danger of flooding by increased flows of the Missouri River will be collected first. This may include eggs from nest sites that are outside my initial study area, such as Lake Sakakawea in North Dakota or Fort Peck in Montana. If there is no immediate danger of flooding by early-June, eggs with the potential to be washed away during seasonal storms will be collected from the Gavins Point reach of the Missouri River. If this potential cannot be determined, eggs may be collected from nests on

the Niobrara River or from randomly selected nests along the Missouri River, early enough in the season to allow for renesting (Wilcox 1959). Full clutches of eggs from each nest will be taken when possible. All eggs will be marked with their nest number and an individual number or letter.

All collected eggs will be incubated at the COE facility. The COE will be responsible for the captive rearing of approximately 50 piping plover chicks using established methods from the 1995-97 field seasons. I will assist in this process, if needed, until there are chicks on the river to be monitored.

We will candle eggs daily to determine developmental stage and place eggs close to hatching in the hatcher of the incubator (C. Kruse, COE, unpubl. data). After the plovers hatch, we will mark individuals with nontoxic felt-tip markers and place them in brooder boxes. Eight brooder boxes make up a pen and up to 4 chicks will be placed in each box. Chicks from the same nest will be put in the same box when possible. The boxes are constructed of wood and lined with carpet remnants and sand. Each box has a light to provide heat for the chicks and when sunlight is available, the chicks will be temporarily placed in an outside pen.

Live insects will be trapped each night. We will feed the plovers insects and mealworms, and provide a nutrient supplement in their drinking water 5 times/day. I will weigh the chicks weekly using an electric scale accurate to 0.01g. I will measure, to the nearest millimeter, exposed culmens, tarsi, and tails using calipers, and wing chords using a wing bar (Pettingill 1990: 448, CWS and USFWS 1977).

Time Budgets

After chicks have hatched in the wild and in the COE captive rearing facility, I will estimate activity budgets for both groups (Appendix 2). I will spend 3-4 days on the river monitoring the wild chicks and 2-3 days monitoring the captive-reared chicks, comparing the percentage of time feeding, preening, resting, alert, or moving (Loegering and Fraser 1995). I will randomly choose the sandbar or brooder box, and time of observation for each day of

monitoring.

I will use focal sampling and scan sampling methods (Martin and Bateson 1986) for documenting time budgets. I will use scan sampling methods to observe all chicks on a sandbar and instantaneous sampling methods to record observations (Martin and Bateson 1986) and record the frequency of behavior in 5 categories: feeding, preening, resting, alert, and moving. Feeding behavior will include drinking water and pecking for insects in the sand. Preening behavior will include bill strokes on their feathers and bathing. Resting behavior will include sleeping or being brooded by an adult plover. Alert behavior will include upright postures, looking around, and being awake exclusive of other behaviors. Moving behavior includes flying, walking, running, or swimming.

Sessions will be 30 minutes long with behaviors recorded at 30-second sample points. At the end of a session, I will use focal sampling methods to observe individual chicks. For focal sampling, I will observe 3 plovers for 5 minutes/each and record all behaviors while the chick is in sight. Using continuous recording methods (Martin and Bateson 1986), I will record the frequency and duration of observed behaviors.

I will observe wild plovers using binoculars and/or a spotting scope from a blind to prevent disturbance of chicks and nesting adults. Disturbance will not be a problem for captive-reared plovers while in their brooder boxes due to the lighting of the brooder room. The brooder room will be dark and the individual boxes will have lights shining on the plovers, keeping observers concealed.

I will also compare the activities of the captive-reared and wild-reared plovers after they have been radio-tagged. I will get a visual recapture of the tagged plovers and monitor them using sampling methods described above. Due to the short duration of this study, I will begin observations the day after radio-tagging plovers and examine the data for any significant differences in behavior as the study progresses.

In addition to comparing behaviors between captive-reared and wild-reared plovers, I will also compare behaviors between marked and unmarked plovers to investigate the possibility

that transmitters may have an affect on plover behaviors and survival. Unmarked plovers will be surveyed when found in flocks on sandbars with marked plovers.

Capture of Wild-reared Birds

Through daily observations of piping plovers I will determine the number of birds available for capture. If the Missouri River is at record flow levels and sandbar habitat is submerged, I may need to capture plovers outside of the Gavins Point reach. If high water conditions exist, I will capture wild-reared birds, release captive-reared birds, and radio-track both groups further north along the Missouri River.

I will capture wild-reared birds prior to fledging. Age of fledging has been estimated at 25-32 days (Cairns 1982), 30-35 days (Wilcox 1959), and 25-35 days (USFWS 1996). Daily field observations will afford us more accurate estimations of fledging time.

Literature concerning the capture of juvenile piping plovers is scarce. Capture methods for adults at nests include drop traps (Wilcox 1959, Cairns 1982, Root et al. 1992) and spring traps (Hill and Talent 1990). These methods will most likely not work on juveniles, as they do not return to nest sites after hatching (Wilcox 1959). Therefore, I will capture the plovers using 2.6 x 9m mistnets (Castro et al. 1991, Root et al. 1992). I will place the mistnets across one end of a sandbar, with the outer edges extending into the water, keeping the plovers from walking around the nets (S. Haig, pers. commun). After the nets are positioned, my technician and I will either boat or walk to the other end of the sandbar and slowly push the birds towards the nets. Another possible method of capture is a noose-carpet, currently being used in Texas with success (J. Thompson, pers. commun.).

We will capture the birds by hand or with a dipnet at the nets and place them in holding bags. I will then weigh the plovers to 1.0g, using a 100g spring scale, and retain those 40g for attachment of a 1.0g transmitter (2.5% body weight).

Transmitter Attachment

We will attach 1.0g transmitters (BD-2, Holohil ltd.) to approximately 30-40 wild-reared and 30-40 captive-reared birds using COE protocol from the summer of 1996 (C. Kruse, COE,

pers. commun.). Transmitters will be 15mm x 7mm x 4mm thick, with a 10cm whip antenna. Feathers will be clipped on the lower back, anterior to the uropygial gland in a patch the size of the transmitter and the radio will be attached with a water-resistant epoxy (Warnock and Warnock 1993). Similar glue-on techniques have been successful on plovers (Hill and Talent 1990) and other small birds (Raim 1978, Sykes et al. 1990, Johnson et al. 1991).

Wild-reared birds will be captured, weighed to 1.0g, and radio-tagged at the capture site to keep handling to a minimum. I will place a light blue Darvic flag on the right tibiotarsus and a stainless steel USFWS 1A band on the left metatarsus of each bird. I will further distinguish captive-reared and wild-reared birds using colored electrical tape attached to the leg flags (J. Plissner, pers. commun.). Sandbar location, bird weight, and radio frequency will be recorded for each bird (Appendix 3). I will observe the plovers for 15 minutes after their release for possible complications from transmitters.

Captive-reared birds will be banded with a light blue Darvic flag on the right tibiotarsus and a USFWS stainless steel 1A band on the left metatarsus and released to a flight pen prior to fledging. Plover weight, band number, and date of release to flight pens will be recorded (Appendix 4). Birds observed to sustain short flights will be weighed and those 40g will be fitted with transmitters. The captive-reared birds will be transported to their release sites via a divided cardboard box. Any captive-reared birds not used in this study will be released into the wild as well.

Release sites for the captive-reared plovers will vary from year to year as habitat conditions and wild plover populations change. Birds will be released along the Missouri River where adequate sandbar habitat exists and territorial or nesting plovers are absent or scarce. It may be possible to release the captive-reared plovers in a flock of wild juveniles preparing for migration (Cairns 1982).

While it is optimal to radio and release all wild-reared and captive-reared birds in the same day, it is unlikely this will be possible due to the time requirements to locate, trap and radio wild birds. I will also need to radio-tag and release the captive-reared birds.

Considering that I must wait until the birds have reached the 40g limit before tagging, I will try to keep the period of attaching transmitters to as short of time as possible.

It may be easier to radio the plovers in small groups and stagger the release dates. I will likely radio 4 groups with 10 wild-reared and captive-reared plovers in each group. When possible, I will radio captive-reared birds the day before radioing wild-reared birds and begin tracking them on the same day.

Telemetry

I will begin the monitoring of wild-reared and captive-reared plovers the day following transmitter attachment and continue a daily effort until migration or transmitter failure. A hand-held H-antennae (RA-14K, Telonics) and/or an omnidirectional whip antenna (RA-5A, Telonics) and a scanning receiver (Telonics) will be used to track the plovers from the boat. I will locate each plover daily with a visual recapture. When possible, I will locate tagged plovers soon after death and record the date, time, location, and cause of mortality, if known (Appendix 5). All specimens will be turned in to the USFWS or COE. Aerial telemetry will be used when I lose signals from radio-tagged plovers to estimate their location, as visual locations from an aircraft are usually impractical when studying small animals (White and Garrott 1990).

Analysis

Survival Data.--Survival of both groups of plovers will be modeled using Kaplan-Meier survival estimators and compared using the log-rank test. Kaplan-Meier analyses account for lost signals and include individuals added after the initial start of the study (Pollock et al. 1989).

The Kaplan-Meier definition is:

$$S(t) = \prod_{J=1}^{N0} \frac{r(Tj) - d(Tj)}{r(Tj)}$$

Where $r(Tj)$ is the number of animals at risk of dying and $d(Tj)$ is the number of animals that died during that interval (White and Garrott 1990:234).

Two survivorship curves can be compared using the log rank test (Cox and Oakes 1984:104-106, Pollock et al. 1989). Like the Kaplan-Meier models, the log rank test allows for a staggered entry experiment design. For these comparisons, it is assumed that all individuals in a population have independent survival times, but that newly radioed plovers will have the same survival function as those tagged previously (Pollock et al. 1989). Another assumption is that radio-tagging has no influence on survival.

There are 3 log rank tests available to examine the hypothesis that survival rates of 2 groups are the same (Cox and Oakes 1984). Each of the tests is an approximate ÷2 statistic with 1 degree of freedom. The tests are:

$$\div 2 = \frac{d2(Tj) - \frac{d(Tj)r2(Tj)}{r(Tj)}\ 2}{\frac{d(Tj)r1(Tj)r2(Tj)r(Tj)\ \ d(Tj)}{r(Tj)2r(Tj) - 1}}$$

$$\div 2 = \frac{d2(Tj) - \frac{d(Tj)r2(Tj)}{r(Tj)}\ 2}{\frac{d(Tj)r1(Tj)r2(Tj)}{r(Tj)2}}$$

$$\div 2 = \frac{d2(Tj) - \frac{d(Tj)r2(Tj)}{r(Tj)}\ 2}{\frac{d(Tj)r1(Tj)}{r(Tj)} - \frac{d(Tj)r2(Tj)}{r(Tj)}\ -1}$$

with each test more conservative than the previous, meaning less likely to make a Type I error

(White and Garrott 1990:240-241).

Behavior Data.--I will average the scan sampling and focal sampling observations for both wild-reared plovers and captive-reared plovers. I will compare wild-reared and captive-reared plover behaviors using a ÷2 or U-Mann Whitney test.

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Collection Protocol

The COE will collect approximately 50 piping plover eggs.

Eggs will be collected from nests with full clutches when possible.

Eggs in danger of flooding by increased flows of the Missouri will be collected in late May or early June.

1a. Eggs will be collected from nests in the Gavins Point reach in South Dakota and Nebraska.

1b. If sufficient nests are not available in this area, eggs will also be collected from nests further north on the Missouri River in South Dakota.

1c. If no nests are in danger of inundation in South Dakota or Nebraska, eggs will be collected from North Dakota or Montana.

1d. If sufficient nests are not available in South Dakota and Nebraska, additional eggs will be collected from endangered nests in North Dakota or Montana.

If there is no danger of flooding by June 12, eggs in erosion zones, which will likely wash away during storms, will be collected.

2a. Eggs will be collected from the Gavins Point reach in South Dakota and Nebraska.

2b. If collection is not possible in the Gavins Point area, eggs will be collected further north in South Dakota.

2c. If this is not possible, eggs will be collected from nests in North Dakota or Montana.

If erosion zones cannot be determined or sufficient nests are not available within them by June 19, eggs may be collected from other nests.

3a. Eggs will be collected from nests on the Niobrara River.

3b. Eggs will be collected from randomly selected nests along the Missouri River.

We will try to collect all eggs early enough in the season to allow for renesting (Wilcox 1959). It is also necessary to collect the eggs by mid-June so that we have plovers in captivity at the same time that wild-reared plovers are on the river. In order to determine the potential of the COE captive-rearing program, we must have plovers in captivity for this research.

LEAST TERN AND PIPING PLOVER PRODUCTIVITY AND HABITAT USE ON THE NIOBRARA RIVER

FIELD SEASON SUMMARIES:
MAY 17 - AUGUST 13, 1996 AND MAY 12 - AUGUST 14, 1997

Cooperators: South Dakota Cooperative Fish and Wildlife Research Unit
and U.S. Army Corps of Engineers
Submitted by: Stacy Adolf, Graduate Research Assistant,
Dr. Ken Higgins, Project Advisor, and Dr. Rex Johnson, Project Co-Advisor

The Niobrara River is one of the few rivers that still responds as a natural river system. It flows along the northern border of Nebraska and is one of the least modified rivers in the Northern Great Plains. Flow levels are determined by a brief period of plains snowmelt, and subsequently by summer precipitation and ground water discharge. The capacity for flooding is high, especially during times of rapid snow melt and heavy rain events. The Niobrara River currently supports a breeding population of interior least terns (*Sterna antillarum athalassos*) and piping plovers (*Charadrius melodus*). By evaluating the Niobrara River, insights may be obtained relative to least tern and piping plover habitat use and productivity on a river system with a natural hydrologic regime. The primary purpose of this study was to determine the characteristics that attract least terns and piping plovers to sandbar islands for nesting.

METHODS

Approximately 100 miles of the Niobrara River were monitored from a canoe in 1996. The study area extended from Springview, NE, downstream to Niobrara, NE where the Niobrara river enters the Missouri River. The study area was divided into 8 river reaches. Reaches were partitioned by bridges and ranged from 5-20 miles long. During the 1997 field season, the number of monitored reaches was reduced to 4 river reaches and included only the areas of the river between the Highway 137 Bridge and the Butte Bridge as well as between the Spencer Dam and the Redbird Bridge (approximately 50 miles of the Niobrara River). Two aerial videography flights were conducted in 1996 to determine the amount of sand exposed during April and following an early June flood. Another aerial videography flight was conducted in June, 1997.

Nest site variables measured included sediment moisture (wet or dry sand), substrate texture, dominant plant species, and percent of vegetative cover within 1 m of the nest bowl center. The approximate mean height of the surrounding vegetation, elevation above water, and distance from water were also recorded for individual nests. Shape, location in the channel, potential predator habitats, and surrounding land use were recorded for each island. Maximum nest elevation, substrate texture, percent vegetative cover, dominant vegetation type, approximate mean vegetation height, percent of wet sand, percent of low sand, presence/absence of heavy vegetation, and possible disturbances (e.g., human, flooding) also were determined for each island. During the 1997 field season, these characteristics also were determined for pairs of systematically selected islands, half with and half without nesting colonies of least terns or piping plovers. Unused islands were selected as the first habitable island downstream from a nesting island.

RESULTS

Piping Plovers

In 1996, piping plovers initiated most of their nests (89.7%) from 29 May - 2 July, with the peak nesting period (the 7-day period during which the highest number of nests was initiated) from 12-18 June (Table 1). Of 447 piping plover eggs laid, 152 (34%) hatched, and 37 (24.3%) of the chicks fledged. During the 1996 breeding season, 126 piping plover nests were initiated, of which 42 (33%) hatched. Of 84 piping plover nests that did not hatch, 4 were lost to flooding, 6 to sandbar erosion, 17 to predation, 2 to abandonment, 6 were destroyed by an unknown cause, and 49 had unknown nest fates.

In 1997, most piping plovers nests (69.1%) were initiated from 29 May - 18 June, with the peak nesting period from 29 May - 4 June (Table 2). Of 225 piping plover eggs laid, 100 (44.4%) hatched, and 55 (55%) of the chicks fledged. In the 1997 breeding season, 68 piping plover nests were initiated, of which 27 (39.7%) hatched. Of the 41 piping plover nests that did not hatch, 3 were lost to flooding, 1 to sandbar erosion, 2 to abandonment, 1 nest contained nonviable eggs, 3 were destroyed by an unknown cause, and 31 had unknown nest fates.

Least Terns

In 1996, most least tern nests (83.6%) were initiated from 5-25 June, with peak nest initiation occurring from 5-11 June (Table 1). Of 544 least tern eggs laid, 307 (56.4%) hatched and 96 (31.3%) of the chicks fledged. During the 1996 breeding season, 213 least tern nests were initiated, of which 117 (54%) hatched. Of 96 least tern nests that did not hatch, 12 were lost to sandbar erosion, 1 to weather, 15 to predation, 4 by abandonment, 3 to an unknown element, and 61 had unknown nest fates.

In 1997, least terns initiated most nests (79.7%) between 29 May and 18 June, with peak nest initiation occurring from 5-11 June (Table 2). Of 356 least tern eggs laid, 176 (49.4%) hatched, and 79 (44.9%) of the chicks fledged. Least terns initiated 133 nests, of which 66 (49.6%) hatched. Of the 67 least tern nests that did not hatch, 3 were lost to flooding, 6 to sandbar erosion, 1 to predation, 1 by abandonment, 1 to weather, 1 nest contained nonviable eggs, 5 were destroyed by an unknown cause, and 49 nests had unknown nest fates.

ONGOING RESEARCH

The 1996 and 1997 aerial videography is still being processed. Characteristics, such as island area, percent heavy vegetation, percent wet sand, and distance to nearest shore, will be documented from the aerial videography. Using the aerial videography, characteristics contributing to least terns and piping plovers selection of nesting sites can be determined. The characteristics of sandbars used for nesting and those not used for nesting will be compared with the videography. Of the sandbars utilized by both species, successful nesting sites will be compared against those nesting sites which were not successful in order to determine is successful sites have characteristics specific only to those sandbars. Sandbars used for nesting sites will also be compared between the 1996 field season and the 1997 field season.

Table 1. Numbers of piping plover and least tern nests initiated and hatched, 1 May - 30 July, 1996, including Julian dates on the Niobrara River, NE.

Date	Julian Date	Piping Plover # nests	# hatched	Least Tern # nests	# hatched
May 1-7	122-128				
May 8-14	129-135	2	0		
May 15-21	136-142	0	0		
May 22-28	143-149	4	0		
May 29-Jun 4	150-156	20	6	3	1
Jun 5-11	157-163	25	6	75	45
Jun 12-18	164-170	37	16	58	27
Jun 19-25	171-177	16	6	45	33
Jun 26-Jul 2	178-184	15	4	5	2
Jul 3-9	185-191	4	2	11	4
Jul 10-16	192-198	3	1	12	3
Jul 17-23	199-205			4	2
Jul 24-30	206-212				
Sum		126	41	213	117

Table 2. Numbers of piping plover and least tern nests initiated and hatched, 1 May - 30 July, 1997, including Julian dates on the Niobrara River, NE.

Date	Julian Date	Piping Plover # nests	# hatched	Least Tern # nests	# hatched
May 1-7	121-127				
May 8-14	128-134	1	0		
May 15-21	135-141	4	4		
May 22-28	142-148	7	3		
May 29-Jun 4	149-155	18	3	26	17
Jun 5-11	156-162	13	5	52	26
Jun 12-18	163-169	16	7	28	12
Jun 19-25	170-176	5	3	9	5
Jun 26-Jul 2	177-183	4	2	7	2
Jul 3-9	184-190			6	1
Jul 10-16	191-197			4	2
Jul 17-23	198-204			1	1
Jul 24-30	205-211				
Sum		68	27	133	66

GOVERNMENT ORDER NO. W59XQG70943972
BETWEEN THE U.S. FISH AND WILDLIFE SERVICE AND THE OMAHA DISTRICT U.S. ARMY CORPS OF ENGINEERS

SCOPE OF WORK AND TASK ASSIGNMENTS

Piping Plover and Least Tern Surveys and Productivity Monitoring
Fiscal Year 1997

PURPOSE AND AUTHORITY

This is a memorandum of understanding (MOU) entered into by and between the U.S. Fish and Wildlife Service (USFWS) and the Omaha District of the U.S. Army Corps of Engineers (Corps). The purpose of this MOU is to establish a scope of work, cost estimate, and responsibilities for the delivery of services to be performed as part of the Corps' responsibilities under the Endangered Species Act of 1973 (ESA), as amended. The accompaning government order purchase request (GO) is to obligate FY 97 funds to finance the continuation of services provided by the USFWS. The GO constitutes an order by the Corps, acting by and through the Contracting Officer, pursuant to the Economy Act, U.S.C. Section 1535, as implemented by the Federal Acquisition Regulation Supplement Subpart 217.5. Each of the parties hereto has the authority and is willing to enter into this MOU and to abide by its terms and conditions.

The Corps received a Biological Opinion (Opinion), concerning the operations of the Missouri River Main Stem System, from the US Fish and Wildlife Service in November 1990. This Opinion concluded that the current operations of the Missouri River would likely jeopardize the continued existence of the interior population of the least tern (*Sterna antillarum*) and the Great Plains population of the piping plover (*Charadrius melodus*). The Opinion provided reasonable and prudent alternatives that, if implemented, would preclude jeopardy to these species. Success of implementing the alternatives and subsequent preclusion of jeopardy, will be based on production, to be measured annually by fledge ratios of both the least terns and piping plovers nesting on the Missouri River. This scope of work for fiscal year 1997 outlines the mission that will be undertaken, not only by the parties entered into the forementioned MOU, but by all participating agencies who will survey populations and enhance and monitor production of both piping plovers and least terns within this region.

OBLIGATION/REIMBURSEMENT OF FUNDS

The following is a cost breakdown for USFWS participation in the scope of work in FY 97:

Personnel	
Wildlife Biologist	$3,000
Technician	1,000
Vehicle/Boat	1,000
Equipment	500
Miscellaneous	500
Subtotal	**$6,000**
Overhead @ 17%	1,020
TOTAL	**$7,020**

It is anticipated that this work will be completed by the U.S. Fish and Wildlife Service-Ecological Services Sub-Office in Billings, MT. This amendment provides the USFWS with the authority to be reimbursed by the Corps for costs incurred for work completed in fiscal year 97. Funds not to exceed $7,020, including 17 percent overhead, are available for work completed in fiscal year 97. The funding citation is 96X3123 OWI-001TN1, FWI-001TL8, GO PR&C W59XQG70943972. The USFWS shall submit invoices (via standard form 1080, if desired) for the costs of performing the work described above, not more than once per quarter to:

U.S. Army Corps of Engineers, Omaha District
ATTN: CEMRO-OP-S (Marilyn Knapp)
215 North 17th Street
Omaha, NE 68102-4978

The invoices should reference the GO PR&C. The effective date of this amendment shall be the date of signature by the authorized representative of the USFWS (see signature block on MIPR).

SCOPE OF WORK

I. **Objectives**

A. Conduct annual census to estimate number of breeding pairs of least terns and piping plovers within the Missouri River Basin.

B. Monitor production of least terns and piping plovers nesting on the Missouri River system and document data using standardized methods to allow for comparison of current years data with data previously collected within the system.

C. Implement alternatives which are fiscally and logistically possible for the enhancement of least tern and piping plover productivity and the survival of young-of-the-year juveniles to flight stage.

II. **Participating Agencies or Offices**

USFWS, Ecological Services Sub-Office, Billings, MT

III. **Geo-region Study Area**

Fort Peck Reservoir, River Miles 1785.0-1771.0, Reach 1

IV. **Breeding Adult Population Census**

A. Survey total numbers of adult least terns and piping plovers during the last week of June through the first week of July, 1997.

B. Record all counts on standardized census record.

V. **Productivity Monitoring**

A. Determine distribution of nesting least terns and piping plovers within each reach and record nest or nesting colony locations on US Army Corps of Engineers aerial mosaics or similar imagery.

B. Determine earliest arrival dates and date of initial nesting or breeding activity within the reach. Determine latest nesting activity and date of last observation of both piping plovers and least terns using the habitat within each reach.

C. Conduct productivity monitoring activities on a 7 to 10 day cycle per site, as per permit conditions, and record all nest site and chick survival data in entirety on standardized data cards.

1. Collect nest data.

a. Determine number of nests initiated, nest initiation dates, number of eggs laid, and number of eggs hatched.

b. Determine principle causative factor or factors responsible for nest termination.

2. Collect chick survival data.

a. Determine number of chicks fledged and estimate date of fledging.
b. Determine principle causative factor responsible for chick mortality.

H. Collect all addled eggs and dead least tern and piping plover adults and chicks, and their parts for analysis by the USFWS, in accordance with procedures required by the Section 10 permit.

VI. Predator Deterrence

A. Implement predator exclosure cages on piping plover nests where predation is limiting or has historically limited nest success.

1. Exclosure cage design should be similar to those previously tested on nesting colonies within the Missouri River.
2. All cage designs, nest success, etc. should be discussed in the final report.

B. Test and implement other forms of predator deterrence or experimental removal (in coordination with USDA-Animal Damage Control office) in areas where predation appears to be limiting least tern and piping plover productivity.

VII. Other Activities

A. Continue to assist in developing a database, using GIS and GPS equipment, of island geomorphological characters and their relationship to nesting site locations including, nest elevation, distance to nearest water, distance to vegetation, distance to shallow water feeding areas, distance to river bank, island topology, etc. Data collected will be used to generate weekly nest site location maps plotted on elevation data and also banked in an arc-info database for comparative analysis.

B. Conduct outreach activities to increase public awareness and knowledge about least terns and piping plovers and the role that they play within the Missouri River ecosystem. These activities should include, but not be limited to, press releases, public service announcements, interviews and/or tours with local media, participation in "awareness" days in the local areas, and daily public relations. These activities should be undertaken in such a manner that all participating agencies and designated missions are spoken of and represented to the highest standard.

C. Provide technical assistance to the Corps for development of better management alternatives and to aid in future planning and

local recovery efforts of least terns and piping plovers on the Missouri River.

VIII. **Reports**

A. Weekly status reports on least tern and piping plover surveying and monitoring results will be sent to Casey D. Kruse, Endangered Species Coordinator for the Operations Division, Omaha District on Friday of each week during the nesting season. These reports will include by site: number of active nests of each species, number of chicks present of each species, adult census (during weeks of the census), total number of fledged chicks of each species and any other pertinent information such as status of nests in relation to water elevation etc. Compiled reports will be forwarded on Monday morning of each week to respective state and federal offices. Reports will be discontinued when all activity is terminated in each respective reach.

B. Final field office reports will be due no later than October 15, 1997. Reports will be sent to Casey D. Kruse, Endangered Species Coordinator for Operations Division, Omaha District. Guidelines for final report format will be forwarded to all participating offices.

IX. **Agency Contacts**

A. US Army Corps of Engineers

Operations Division

FOR TECHNICAL ASSISTANCE
Casey D. Kruse
Endangered Species Coordinator
PO Box 710
Yankton, SD 57078
(402) 667-7873 ext. 3333

FOR CONTRACT ASSISTANCE
John Kirwan
CEMRO-OP-TN
215 N 17th St.
Omaha, NE 68102-4978
(402) 221-4686

B. U.S. Fish and Wildlife Service

Montana
Dennis Christopherson (406) 247-7366
CMR National Wildlife Refuge (406) 526-3464

MEMORANDUM OF AGREEMENT
BETWEEN
THE DIVISION OF COOPERATIVE RESEARCH
OF THE U.S. GEOLOGICAL SERVICE
AND
THE U.S. ARMY CORPS OF ENGINEERS, OMAHA DISTRICT

PURPOSE AND AUTHORITY

This Memorandum of Agreement (MOA) is entered into by and between the Biological Resource Division Cooperative Unit of the U.S. Geological Service (USGS) and the U.S. Army Corps of Engineers, Omaha District (Corps). The purpose of this MOA is to establish a Scope of Work, cost estimates, and responsibilities for the delivery of services to be performed as part of the Corps' responsibilities under the Endangered Species Act of 1973 (ESA), as amended. The accompanying government order purchase request (GO) is to obligate FY 97 funds to finance the service's to be delivered by the USGS. The GO constitutes an order by the Corps, acting by and through the Contracting Officer, pursuant to the Economy Act, U. S. C. Section 1535, as implemented by the Federal Acquisition Regulation Supplement Subpart 217.5. Each of the parties hereto has the authority and is willing to enter into this MOA and to abide by its terms and conditions.

The Corps has responsibility for numerous activities on the Missouri River that include regulation of the flow regime, dredging, bank stabilization, and permitting approval under Section 404 of the Clean Water Act and Section 10 of the River and Harbor Act. Under the ESA, the Corps must ensure that these actions would not jeopardize the continued existence of any federally listed threatened and endangered species. The purpose of this MOA is to gain some of the necessary information to ensure compliance with the ESA regarding the endangered interior least tern and the threatened piping plover on the Missouri River.

SCOPE OF WORK: GAVINS POINT PROJECT RESERVOIR AND RIVER REACH

Study Proposal and Request for Funding

The Corps received a Biological Opinion (Opinion), concerning the operations of the Missouri River Main Stem System, from the U.S. Fish and Wildlife Service in November 1990. This Opinion concluded that the current operations of the Missouri River would likely jeopardize the continued existence of the interior population of the least tern (Sterna antillarum) and the Great Plains population of the piping plover (Charadrius melodus). As a result, the Corps, as the action agency under the ESA, Section 7 (a) (2), "must ensure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of a listed species or results in the destruction or adverse modification of critical habitat".

The Opinion provided reasonable and prudent alternatives that, if implemented, would preclude jeopardy to these species. Success of implementing the alternatives and subsequent preclusion of jeopardy, will be based on production, to be measured annually by fledge ratios of both the least terns and piping plovers nesting on the Missouri River. The scope of work for fiscal year 1997 will outline the mission that will be undertaken, by the parties entered into the aforementioned MOA.

The Gavins Point Project in south eastern South Dakota and North Eastern Nebraska provides a unique opportunity to evaluate the survival of fledgling piping plovers that are reared in captivity, compared to wild hatched birds. The Gavins Point area is unique because it normally has a large number of plovers and has a captive rearing facility on the project. The Corps has been very successfully in captivily rearing plovers for the past two years but we do not have data to help us determine the fate of these birds after they are released back into the wild. We propose that this research will provide us with that data and enable us to better evaluate whether the time and effort expanded in captivily rearing is a justifiable option.

PURPOSE:

To use radio telemetry to evaluate survival of captivily reared and wild reared piping plover fledglings while on the Missouri River and to evaluate time and effort based on the survival percentage.

PRINCIPLE INVESTIGATOR:

Principle Investigator:

Mr. R. Scott Lutz, Department of Wildlife Ecology, 1630 Linden Dr., 226 Russell Labs, University of Wisconsin, Madison, Wisconsin.

Cooperative Investigators:

Mr. Donald Rusch, US Geological Service, Cooperative Wildlife Research Unit, 226 Russell Labs, University of Wisconsin, 1630 Linden Drive Madison, Wisconsin.

Ms. Neil McPhillips, Endangered Species Specialist, US Fish and Wildlife Service, Pierre, South Dakota.

Mr. Casey Kruse, Endangered Species Coordinator, Omaha District, US Army Corps of Engineers, Yankton, South Dakota.

Mr. John Kirwan, Endangered Species Coordinator, Omaha District, US Army Corps of Engineers, Omaha, Nebraska.

OBLIGATION/REIMBURSEMENT OF FUNDS

The following are the cost items, including the grand total, available to the USGS to carry out the scope of work in FY 97:

Personnel Including: Professor, Graduate Resident Assistant, Three Technicians
Equipment Including: Transmitters, Receivers, Antennas, Vehicle Lease, Gas
Office Supplies: Phone, Copying
Travel Including: To and From Site, Meetings
Miscellaneous

Subtotal:	**$40,000.00**
Overhead (20%)	8,000.00
TOTAL:	**$48,000.00**

It is anticipated that this work will be completed by the USGS-Biological Resource Division Cooperative Unit at the University of Wisconsin (UW), in Madison, Wisconsin. This MOA provides the USGS with the authority to be reimbursed by the Corps for costs incurred for work completed in fiscal year 97. Funds not to exceed $48,000.00, including 20 percent overhead, are available for work completed in fiscal year 97. The funding citation is 96x3123
The USGS shall submit invoices (via standard form 1080, if desired) for the costs of performing the work described above, not more than once per quarter to:

U.S. Army Corps if Engineers, Omaha District
ATTN: CEMRO-OP-S (Marilyn Knapp)
215 North 17th Street
Omaha, NE 68102-4978

The invoices should reference the GO PR&C. The effective date of this MOA shall be the date of signature by the authorized representative of the USGS (see signature block on MIPR).

Scope of Work:

I. **Objectives**

A. Evaluate survival between fledgling piping plovers reared in captivity and wild hatched birds.

B. Evaluate time and activity budgets between fledglings hatched in captivity and wild hatched fledglings.

II. **Participating Agencies or Offices**

USGS, Biological Resource Division Cooperative Unit, at the UW, in Madison, Wisconsin.

III. **Geo-region Study Area**

Gavins Point Project from the mouth of the Niobrara River, RM 745.0, to Ponca, Nebraska, RM 756.0.

IV. **Effective Dates**

Project Initiation: August 1, 1997
Project Completion: December 31, 2000

V. **Work Method**
Survival:

A. Will take direction from Endangered Species Coordinator, Casey Kruse, in regards to collection of eggs, rearing of chicks, handling protocol, and radio-transmitter attachment procedures.

B. Use telemetry to monitor survival of captively reared and wild reared piping plover (Charadrius melodus) fledglings while on the Missouri River.

C. Collect approximately 50 eggs from piping plover nests within the Upper Missouri River.

D. These eggs will be incubated and the chicks captivily reared at the Corps captive rearing facility using established protocols. Holohil Radio transmitters, weighing no more than 1.1g and having a life expectance of 7 weeks, will be attached to a minimum of 30 plovers.

E. The 30 birds will be released in mid-July, when they are about 25 days old and when they weigh approximately 50g.

F. Also in mid-July about 30 wild reared juveniles, weighing approxiametly 50g, will be captured, with mist nets, from the Upper Missouri River. This operation will be under close supervision by Casey Kruse.

G. The wild reared plovers will also be fitted with the Holohil radio transmitters described in D.

H. The radio tags will be attached with the same glue technique used by the Corps in 1996.

I. All radioed birds will be fitted with a light blue Darvic TM flag on the right tibiotarsus and with a serially numbered Service stainless steel 1A band on the left metatarsus.

J. All radioed taged birds will be released in the same river reaches used by the wild reared birds

K. Monitor survival of radioed birds 3-5 times per week by relocating radio tagged birds and getting a visual recapture. We will model survival of these 2 groups of radio tagged plovers by using Kaplan Meier survival estimators and comparing survival curves during this 4 week period (week 5-8 of age) using the appropriate test (Wilcoxon, Log rank, or Cox/Mantel test).

L. Documentation of behaviors of radio marked birds during 20 minute sampling periods will be recorded.

M. Analyze the survival data and write up this pilot project to present (authors to include Kruse, Lutz, McPhillips, and Niver) in Feburary 1998 at the Least Tern and Piping Plover Symposium.

VI. Study Documentation and Reporting:

A. Plan of study development and methodologies and techniques used to track and evaluate survival will be the responsibility of the principle investigator.

B. All necessary permits will be the responsibility of the principle investigator.

C. Field reports will be provided monthly and an annual progress report by the end of each year. The final report will be submitted no later than 31 December 2000.

VII. Agency Contacts:

A. U.S. Army Corps of Engineers

Operations Division
FOR TECHNICAL AND CONTRACTUAL ASSISTANCE:

Casey D. Kruse
Endangered Species Coordinator
PO Box 710
Yankton, SD 57078
(402) 667-7873 ext. 3333

John F. Kirwan
Endangered Species Coordinator
CEMRO-OP-TN
215 N 17th Street
Omaha, NE 68102-4978
(402) 221-4686

B. U.S. Geological Service, Cooperative Wildlife Research Unit
Donald Rusch, (608) 263-6882
U.S Fish and Wildlife Service
Neil McPhillips, (605) 224-8693

ECONOMY ACT DETERMINATION AND FINDINGS

1. I have reviewed the requirements for telemetry monitoring to evaluate survival between threatened piping plover (plover) fledglings that are reared in captivity and wild hatched birds that the Corps of Engineers (CE) proposes to place with the US Geological Service (USGS) as an interagency order under the Economy Act. My review resulted in the following findings:

a. The proposed acquisition is authorized under the authority of the Economy Act.

b. The CE is legally authorized under the authority of the Economy Act.

c. Adequate funds are available.

d. The action does not conflict with any other agency's authority or responsibility. Specifically, a review of Par 8 of FAR, Part 208 of the DFARS, or other part, as applicable, reveals that the responsibility for acquiring this supply or service has not been assigned to an agency other than the one proposed.

e. The services cannot be provided in the time required or more economically by contractors under a CE contract.

f. The USGS has unique expertise or ability not available within the DoD.

h. The services are clearly within the scope of activities of the USGS and that agency normally provides those services for itself.

i. The cost to the CE for the requirement, including the administrative fees charged by USGS, appears to be reasonable. The fees proposed to be paid to the USGS do not exceed the USGS actual cost, including overhead, of providing plover fledgling survival monitoring.

j. The administration procedures related to USGS's fledgling survival monitoring are adequate for CE requirements. USGS will conduct the fledgling survival monitoring with their Biological Resource Division Cooperative Unit.

k. All approvals and authorization required by CE and DoD regulations and policies for acquiring the services have been obtained.

l. The requirement is a bonafide need of the CE.

2. Given the above findings, I hereby determine that it is in the best interest of the Government to place an order for fledgling plover survival monitoring with the USGS under the authority of the Economy Act.

ROBERT D. VOLZ
Colonel, Corps of Engineers
District Engineer

CEMRO-OP-TN 03 April 1997

MEMORANDUM FOR CEMRO-OP-TN (Kirwan)

SUBJECT: 1996 Field Survey/Monitoring Scope of Work and Government Order for the Least Tern and Piping Plover

1. Enclosed is the Scope of Work (SOW) and Government Order (GO) purchase request for least tern and piping plover survey/monitoring activities this summer. The U.S. Fish and Wildlife Service (USFWS) ecological services office in Montana will be funded again this year for their assistance with survey and monitoring activites.

2. Please review the enclosed GO and SOW for accuracy. Procedure should be the same as last year. This will need to be sent to the Regional Office in Denver for signature.

3. Point of contact in Operations Division is Casey D. Kruse, (402) 667-7873. Thank you for your prompt attention to this matter.

Casey D. Kruse

ENCL

CASEY D. KRUSE
Endangered Species Coordinator
Operations Division

cf:

Mr. Dennis Christopherson
US Fish and Wildlife Service
2900 4th Avenue North, Rm 301
Billings, MT 59101

CEMRO-OP-TN (George)

1997 Release Monitoring Program - A Proposal*

15 May 1997

* (as required by ES/TE/ Permit, Permit PRT-704930, Subpermit 93-07, condition 1.d.6)

Background: This Release Monitoring Program (RMP) is the result of a cooperative effort among the U.S. Army Corps of Engineers-Omaha District (COE), University of Wisconsin-Madison, Dept. of Wildlife Ecology (UW), and U.S. Fish & Wildlife Service, South Dakota Field Office (Service).

Piping Plovers - UW Pilot Study

Methods: UW proposes the following pilot-project to be used to develop procedures for monitoring the survival of natal season juvenile piping plovers. This pilot-project will investigate both captive-reared and wild-reared juvenile plover survival. Casey Kruse, COE, Endangered Species Biologist, has worked closely with the collection and rearing of piping plovers for the last 2 years and we will follow his lead on egg collection, rearing, and radio-transmitter attachment procedures. Procedures and methodologies used to collect, incubate, and captive rear are contained in appendices A and B of the COE's subpermit 93-07. The COE has hired the UW-Madison M.S. graduate student, Robyn Niver, to help Casey with his duties and to implement this pilot project. This pilot study proposes to:

1. Collect approximately 50 eggs, prior to June 15, from piping plover nests within the Missouri River watershed. These eggs are to be hatched and chicks captive-reared at the COE's captive rearing facility using established protocols. Our goal is to radio tag and release approximately 30 of these birds when they weigh about 50 g (mid-July).

2. Use dipnets to capture and radio tag up to 30 wild piping plover juveniles from the Missouri River watershed when the chicks weigh about 50 g (approximately 25-28 days of age).

    a. Use radio transmitters weighing no more than 1.1 g that will transmit for 6-7 weeks; manufactured by Holohil.

    b. Attach the radio tags using the glue technique used successfully by COE during the summer of 1996.

    c. Radioed birds will be fitted with a light blue Darvic ™ flag on the right tibiotarsus and with a serially numbered Service stainless steel 1A band on the left metatarsus.

d. Birds will be monitored 3X/week using hand held H and Yagi antennas from boats.

3. Radio-tag 25-30 captive-reared piping plovers, just prior to release (approximate weight 50 g).

   a. Radio tag protocol will be identical to that we use on the wild-reared plovers.

   b. Radioed birds will be fitted with a light blue Darvic ™ flag on the right tibiotarsus and with a serially numbered Service stainless steel 1A band on the left metatarsus.

   c. Birds will be released into the same river reaches being used by the wild reared radioed birds.

4. Monitor survival of radioed birds 3-5X/week by relocating radio tagged birds and getting a visual recapture. We will model survival of these 2 groups of radio tagged plovers using Kaplan Meier survival estimators and compare survival curves during this 4 week period (week 5-8 of age) using the appropriate test (Wilcoxon, Log rank, or Cox/Mantel test).

5. Analyze the survival data and write up this pilot project to present (authors to include Kruse, Lutz, McPhillips, and Niver) in February 1998 at the Least Tern and Piping Plover Symposium.

Piping Plovers - any remaining individuals

Any additional plovers captively reared and not utilized in the pilot survival study, will be fitted with a light blue Darvic ™ flag on the right tibiotarsus and with a serially numbered Service stainless steel 1A band on the left metatarsus, similar to the radio-tagged birds. Banded fledglings, capable of sustained flight, will be released on sandbar habitat that provides a secure release site for a minimum of two weeks post-release. Piping plover broodmates will be grouped and released (1) onto sandbars with no existing nesting or brooding piping plover adults, to prevent any territorial aggression towards the released birds, or (2) released in staging flocks of juvenile flighted plover chicks.

Release sites will be monitored daily for the first seven days post-release and 3X weekly after that until mortality is determined or the birds leave the release area. Birds will be located with binoculars or spotting scopes.

Least Terns

Least tern eggs will be collected only if the nest is threatened with inundation from rising flood waters or from the discharge of water at the flood storage evacuation service level. Tern eggs will be collected and captively reared according to procedures and methodologies contained in appendices A and B of the COE's subpermit 93-07. Once tern chicks are fully flighted and observed to be procuring their own food, they will be banded with a serially numbered size 1A stainless steel Service band on the left metatarsus and prepared for release. Least tern broodmates will be grouped and (1) released near active least tern colonies where juvenile least terns are fledging and beginning to forage for themselves, or (2) released into staging flocks of juvenile flighted least tern chicks when available.

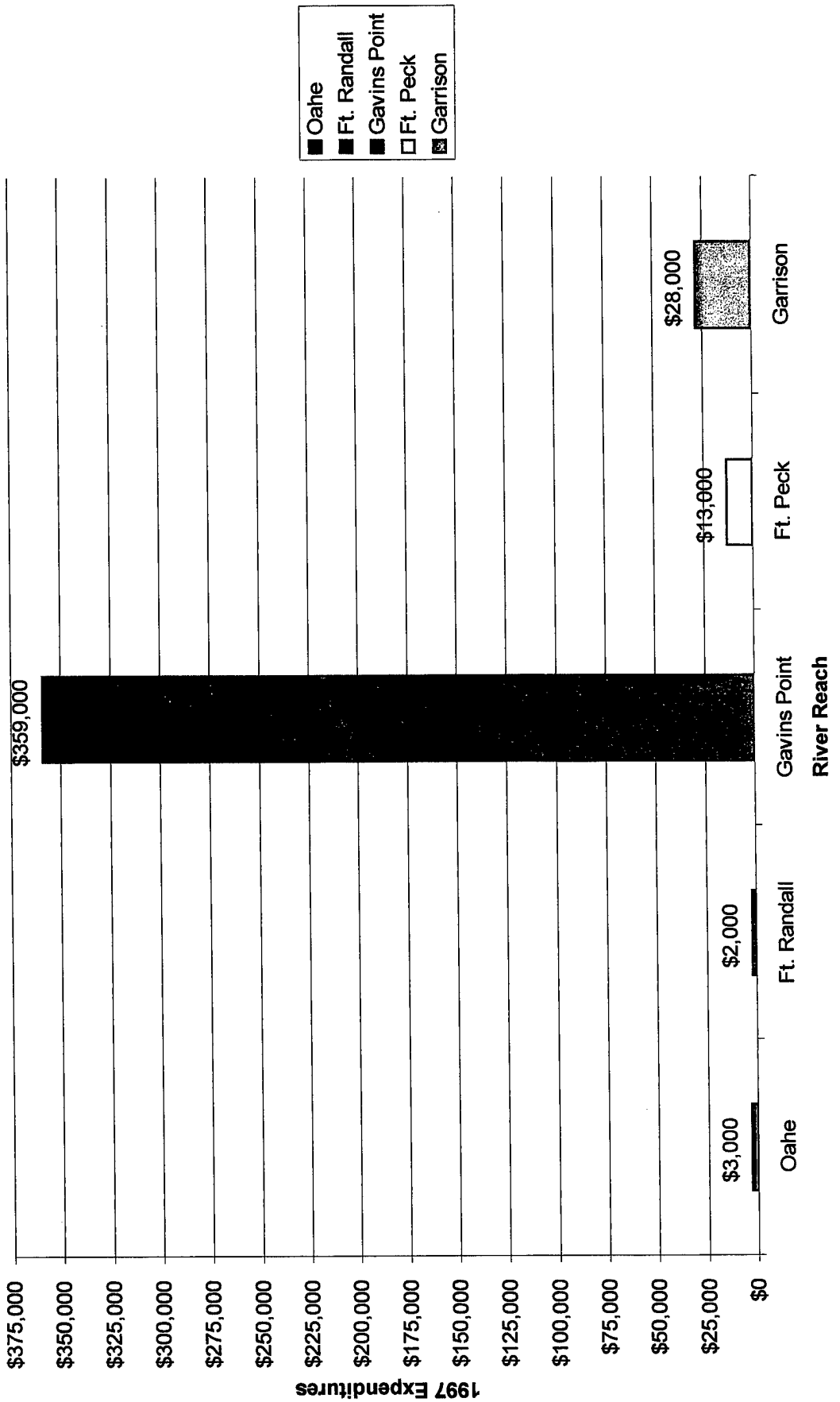
Up to 25 banded least tern chicks will be fitted with radio transmitters manufactured by Holohil weighing no more than 1.1 gram that will transmit for 6-7 weeks. Radioed bird survival will be monitored 3-5X/week, using hand held H and Yagi antennas to relocate birds and getting a visual recapture. Birds will be monitored from vehicles on the riverbank, boats, or aircraft.

All fledged least tern chicks not radioed will be released in habitats similar to the radioed birds. Efforts will be made to visually locate marked birds 3-5 X/week until mortality is determined or the birds leave the release area. Birds will be located with binoculars or spotting scopes.

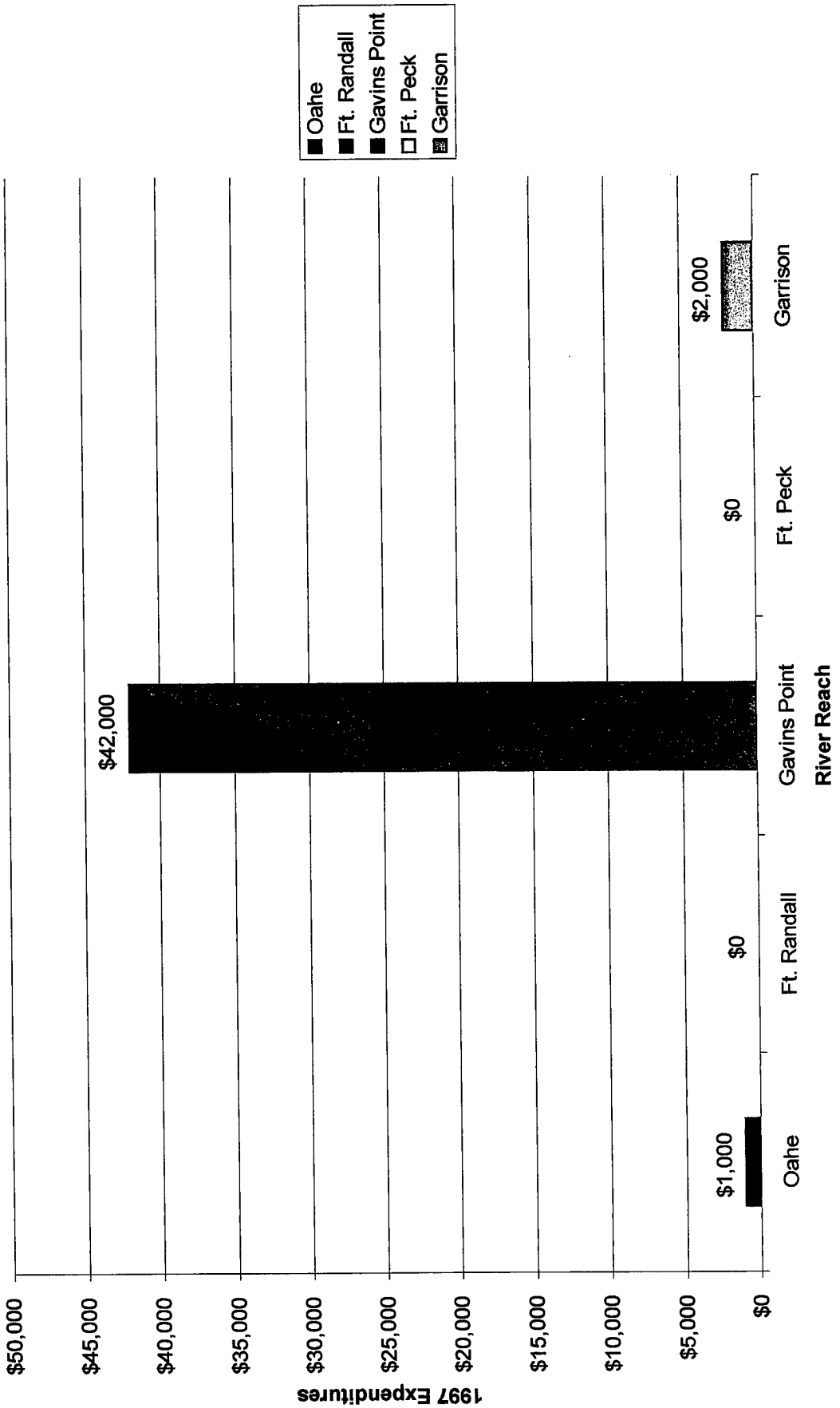
APPENDIX J

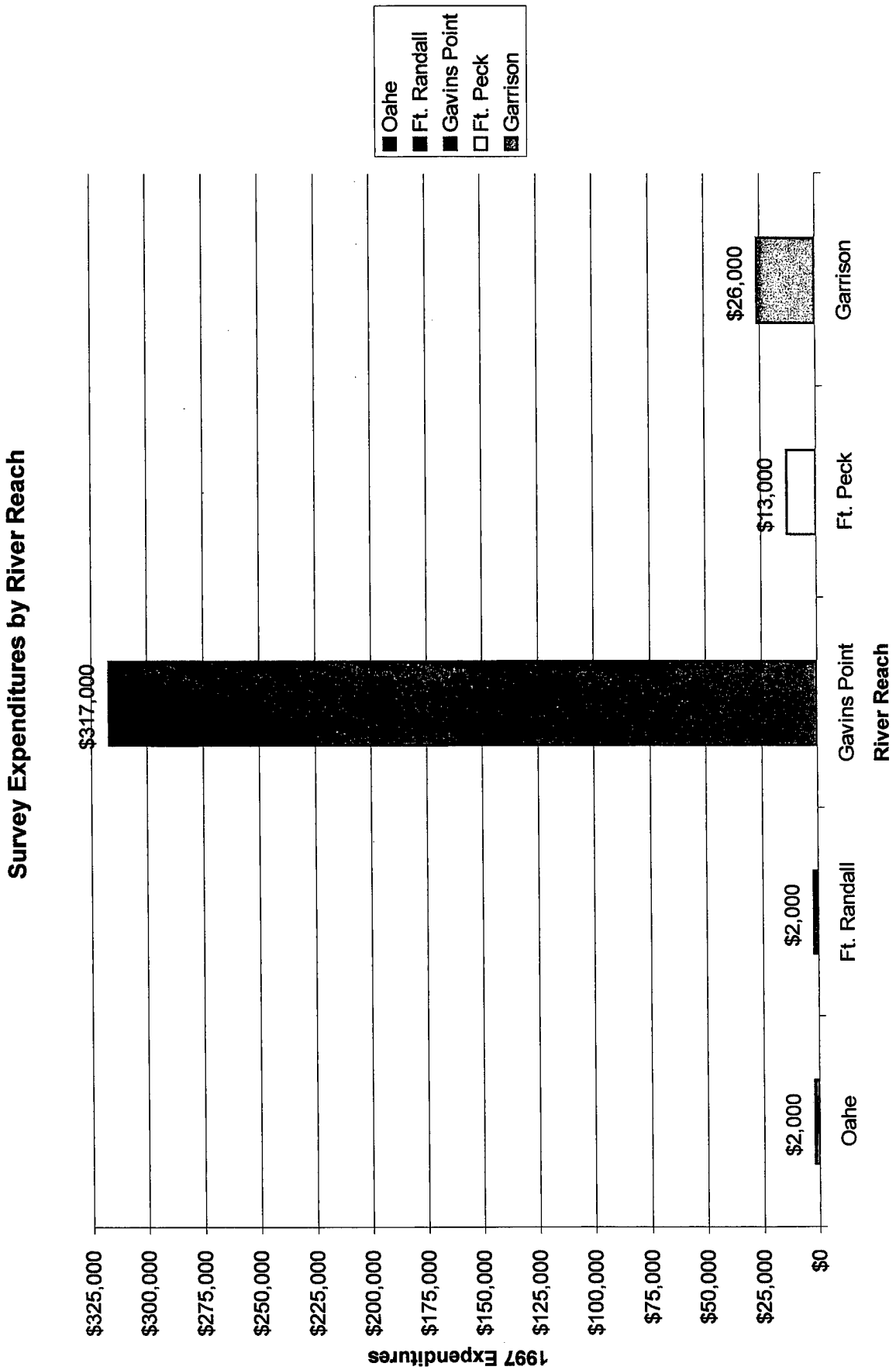
BUDGET INFORMATION

Total Expenditures by River Reach



Habitat Expenditures by River Reach




Survey Expenditures by River Reach
Oahe
Ft. Randall
Gavins Point
Ft. Peck
Garrison
$325,000
$300,000
$275,000
$250,000
$225,000
$200,000
$175,000
$150,000
$125,000
$100,000
$75,000
$50,000
$25,000
$0
1997 Expenditures
$2,000
$2,000
$317,000
$13,000
$26,000
Oahe
Ft. Randall
Gavins Point
Ft. Peck
Garrison
River Reach